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EDITORIAL

INTRODUCTION

THE ANNALS OF INTERNAL MEDICINE in this number is participating in the publication of a symposium of articles on topics which are of interest jointly to both the medical and the legal professions.

Physicians in the practice of their profession repeatedly come into contact with the law. Too many of us have been quite unconscious or oblivious of these contacts. In most cases this appears to be of little immediate significance, as these contacts so rarely become actual conflicts. It is none the less important, however, that we should be better informed as to our duties and responsibilities under the law. It is hoped that this symposium will contribute to that end.

Special stress is laid on the importance of establishing "scientific proof," and on the care necessary to accomplish this in certain specific cases. By this is meant the assembling of precise dependable knowledge of the significant facts in any case under investigation. This is manifestly essential, and indeed is our first aim, for the proper treatment of any patient. This need becomes doubly evident, however, if the patient is the victim of some compensable injury, such as may result from exposure to some occupational hazard or accidental trauma.

The legal requirements and restrictions as to admissibility of evidence are designed primarily to insure that as far as possible this comes up to the standard of "scientific proof," that it is accurate, adequate and pertinent. The occasional failure to do this to the best advantage, particularly if medical problems are involved, neglect to utilize the newer discoveries of medical and other sciences, are most often due to mutual indifference or ignorance on the part of each profession of the problems and specialized knowledge of the other. As is pointed out more competently in the Preface and Foreword which follow, one major purpose of the symposium is to arouse the interest of the members of both professions in these and other common problems and to stimulate a coöperative effort toward their solution.

The ANNALS OF INTERNAL MEDICINE has been fortunate in having the services of Dr. Hubert Winston Smith as special editor of this symposium.

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He has secured the coöperation of eminent writers from both professions, who have contributed authoritative articles in their special fields. Other articles in this symposium are being published simultaneously in Clinics and in Annals of Surgery. They are also being published in various legal journals. A master index of the entire symposium may be found elsewhere in this number. A few articles completed too late for inclusion in this number, it is expected will appear in subsequent issues of this journal.

PREFACE

If you are a strict individualist, you will think of law as a giant roof, pretty far above the ground, and mainly useful to shelter us from storms. You will be glad to see it kept high above our heads, even at the expense of having a little rain blow in occasionally. I think all Anglo-Saxons have something of this feeling. We do not care to surrender individuality or idiosyncrasy to gain a saltless Utopia.

But whatever may be the occasional conflict between individual freedom of expression and the social good, there need not be the serious contradiction that some would have us believe. Personal expression, on the whole, is very personal. Society can well afford to hold secure to John Doe his isolated retreat whereon hangs the sign: "Private property, trespassers keep out." This does not become incongruous by the fact that society has a motorcycle patrol on the transcontinental highway which runs by his door. There are spheres of individual life and spheres of social life. We may hope to add vitality and meaning to both at the same time.

Now in times past we have gone far by relying primarily on the analytical technic. Today we stand at the threshold of social synthesis. We who have rested content on the couches of our fathers must now bestir ourselves.

What more spirited or auspicious beginning could we make than to call the men of law and science to join their talents? It has seemed to me that we who belong to these two pursuits have a natural symbol, attractive to us both: *Scientific Proof*. This term has two applications: evidentiary and jurisprudential. Scientific Proof in the first sense implies making use of the best evidence available to determine basic questions of fact. It includes non-expert as well as technical evidence. In the second usage, Scientific Proof suggests the need for verifying facts by the most trustworthy methods before declaring doctrines of law involving "public policy," before writing or enacting a statute, or before promulgating a social theory. Scientific Proof is a high concept; if its requisites are flouted, science loses its chief bulwark and law its guarantee of justice. Roscoe Pound saw long ago, in developing his philosophy of Sociological Jurisprudence, that law is more than a passive thing. He saw that it can renew and revive itself, and that it can become an active force functioning to achieve "social control through law." We who would bring the legal and scientific traditions into close interaction are but giving content in one direction to his projected vision.

History shows us that neither tradition has ever escaped the impact of the other; now, however, we must replace accidental collision with specific coöperation. This purpose has motivated organization of the present Symposium Series on "Scientific Proof and Relations of Law and Medicine." We have tried to avoid vague and vaporous protestations of brotherhood. We have felt it more important that we confine ourselves to lively law-science

problems than to exchange felicitations. It is a work for all hands, and not for ours alone. We have used technical terms economically and clung to first principles to see if we could achieve a basic presentation intelligible to both professions and to the interested layman.

I must here thank each of my learned authors and each of the coöperating journals for adding luster to the effort.

HUBERT WINSTON SMITH,
Cambridge, Mass.

FOREWORD

Civilization is a cumulative activity. The mastery over nature which has enabled man to inherit the earth is an accumulation of experience and discovery set in order and developed by reason. As the accumulation goes on, it calls for increasingly minute division of labor both in investigation and discovery, and in systematizing and developing what has been discovered. The result is an extreme specialization of learning. It is no longer possible for any one to take all knowledge for his province even in his own field. He can only master his corner of it. Each minutely specialized discipline goes its own independent way without reference to any other.

Today there is an increasing tendency to break down the barriers which had come to separate the fields of learning. But this cannot mean that those working in any one may themselves know all that is required to be known or the accumulation in others in order to make their own more effective. It requires coöperation of the specialists in all fields in order to bring all knowledge into relation.

Legal precepts presuppose as given the facts to which they are applicable. When the facts are established a rule of law fixes the legal result. But the facts in any concrete controversy are seldom so given to us as to permit a mere mechanical process of applying the appointed legal precepts. They must be ascertained, and in ascertaining them courts have always had to call upon the medical profession for assistance in interpreting the evidence. To take a memorable example, in the English witchcraft trials of 1644 an experiment conducted by some skeptical persons threw doubt upon the testimony for the prosecution. Thereupon the court called Sir Thomas Browne, a leading physician of the time, and as the report tells us, "a person of great knowledge." After hearing the evidence and seeing the children claiming to be bewitched, he gave it as his opinion that they were, told of some recent cases in Denmark where there were the same manifestations, and explained how the witches had operated. The court could do no more than accept the opinion of so great an authority. But the lesson of judicial fallibility resulting from fallibility of the means of ascertaining the facts is always with us.

The Anglo-Saxon has been charged with muddling through even such practical matters as war. He is wont to leave as much as possible to experience instead of providing for things in advance. But the conditions of today call for planned and ordered coöperation of the lawyer and the man of science in doing systematically for types of questions what has been done unsystematically and often blunderingly for each case as it arose. If not, as Daniel Webster thought, the chiefest, justice is a chief interest of mankind. Coöperation toward making the administration of justice the best that it can be made is a duty of all of us.

ROSCOE POUND,
Cambridge, Mass.

SCIENTIFIC PROOF AND RELATIONS OF LAW AND MEDICINE *

By HUBERT W. SMITH, *Cambridge, Massachusetts*

THE anvil of the law has always resounded to the striking iron of science. Some tough metal has been beaten out there, sometimes into curious shapes, and few members of the populace can have failed to hear the reverberating blows or to see the cascading sparks which fly from those impacts. Despite all this, there is a cloud of uncertainty, an obscuration of terms, a lack of sharp definition which tend to invest vital aspects of law-science correlations with a curious mystery.

One of the fair sex who had attained to the pinnacle of 15th Vice-President of the American International Medico-Legal Congress, held in Chicago in 1893, showed that even she was more fervent about the cause than fully orientated. In response to an invitation from the chair, she delivered herself as follows: [1]

> Mr. President, Ladies, and Gentlemen: I know absolutely nothing about medical jurisprudence. Speaking, however, on general grounds, I know of no branch of science in which woman is more deeply interested. If any one has suffered from lack of such knowledge it is woman. The verdicts which are rendered against woman in the courts could, many of them, be traced to her ignorance of medical jurisprudence, and certainly we should welcome every research of that kind. I have been very much interested lately in the reports that have been published along this line of investigation. Many of them, I believe, will modify greatly the law in respect to its judgments on women. I believe woman should be tried by at least one of her peers, and I shall be very glad to welcome a law that medical women should sit on the bench in cases where judgment is to be rendered upon woman. I am stating this opinion in all humility, because I am utterly inadequate to speak on the subject of medical jurisprudence, but, you know, women 'rush in where angels fear to tread.'

If I had the wit and the courage of Bernard Shaw, I should try to match his tome entitled "An Intelligent Woman's Guide to Socialism" by a companion volume delineating the fruitful relations of law and medical science.

Even Justice Benjamin N. Cardozo, that rare judicial mind who added luster to the New York Court of Appeals and then to the United States Supreme Court by the quality of his legal opinions, kept at a cautious height when he spoke on "What Medicine Can Do For Law." [2] In considering what might come from the impacts of the two traditions, the Justice said: "Vain is the attempt to forecast here and now the lines of the transfigured structure."

* Received for publication February 13, 1943.

[1] Transactions of the American International Medico-Legal Congress of 1893 (1893) 11 Medico-Legal Journal 162.

[2] Address before New York Academy of Medicine, Bull. New York Acad. Med., 1929, v. 581.

I take up the task of describing this blacksmith shop, and the manner of things we might make there, with a certain zest. I think now we can reduce imaginings to reality. I have called to my aid luminous men of the law, masters of medicine, and stout fellows of science. Each has undertaken to illuminate some corner of the law-science workshop.[3]

To those who have contact with the judicial process, medical science is symbolic of the whole law-science diathesis. Inept words tend to obscure the breadth of law-medicine relationships. "Medical jurisprudence" is one such term. It has been used to describe a variety of things: sometimes the application of legal doctrine to medical practice, sometimes the special applications of medical knowledge to evidentiary problems which come before tribunals of the law. The term "Forensic Medicine" has a nice ring, and it is used abroad to signify the specialized applications of medical science in all varieties of legal proceedings. The American synonym, "Legal Medicine," makes the label sharper but raises an unwarranted inference that ordinary medicine may not be so legitimate. None of these terms conveys the true spirit or full content of law-medicine relationships, which in their totality represent social synthesis and correlation of a major variety. There is no universal authority on "Legal Medicine." In law-medicine, as in law-science relationships, we look upon a giant mosaic built up by many hands.

One of the cardinal activities of life is the making of proof. As in everyday life, the discovery of ultimate facts to guide action or decisions has a primary importance to the just working of the judicial process. All rules of substantive law assume the existence of basic facts on which to operate. Let these facts be distorted in their ascertainment, and the result may be as harsh as if defective legal principles were applied to agreed facts. For that reason, one signal aid which science may extend to law lies in the range of what we may call Scientific Proof. By Scientific Proof I mean the use of those scientific means and methods calculated to enable the accurate ascertainment of ultimate facts, either as a basis for settling private litigation (evidentiary), or as a means of forming or orientating legal or social policy (jurisprudential). Scientific Proof, so conceived, goes to the basis of action; it glorifies fact-finding functions and mechanisms; it gives solid substance upon which enlightened opinions may be formed, and it sets itself against all species of distortion in ascertaining and reporting facts. Its connected findings may well form a chain of criticism leading from fact to opinion, so tight and so strong that no speculative opinion can be inserted.[4]

[3] The present paper introduces a Symposium Series on "Scientific Proof and Relations of Law and Medicine." As I proceed, I shall draw attention to studies prepared by fellow authors. An asterisk will be used immediately preceding each reference to a symposium article.

[4] To borrow a homely phrase of the Texas rancher, our ideal in Scientific Proof is "to build the fence horse high, pig tight and bull strong." The primary ideal of Scientific Proof is to eliminate error and to secure truth by these means:

(1) The use of all appropriate methods of corroboration, with accent on diverse sources and types of evidence;

(2) The eventual grading of all types of evidence according to relative probative value;

In the evidentiary field, Scientific Proof will be found to revolve around three categories of problems, namely:

I. Problems of identification (including existence and non-existence).
II. Problems of causation.
III. Problems of effects.

The specific content of each main series of problems differs according to the field of substantive law which gives rise to the litigation. This is a basic concept of all proof-making in courts of law. One must be able to state the ultimate facts necessary to prove a prima facie cause of action or defense. This has to do with burden of proof. The proponent of the issue must produce such quantum of evidence as will require the trial court to say mentally: "The evidence here is such that I cannot instruct a verdict for the antagonist. Remembering that as judge, I administer the law, but leave it to the jury to find the facts whenever there is substantial and conflicting evidence, I must charge the jury as to its legal function and leave it to those twelve men to retire, deliberate and find the true facts upon which to found their verdict." Substantive law doctrines thus operate to specify the essential facts to be proved, and so to determine the relevancy of particular evidence. Despite considerable overlapping in type problems and in methods, Scientific Proof breaks down into four fairly discrete categories. These are:

I. Clinical Forensic Medicine
II. Forensic Pathology
III. Scientific Crime Detection
IV. Modes and Mechanisms of Scientific Proof

I. Clinical Forensic Medicine and Some of Its Outstanding Problems

Clinical Forensic Medicine embraces all varieties of medical practice which may yield evidence relevant to litigated issues by use of those tests and methods currently employed in diagnosing and treating patients. The expert witness is a practicing physician or surgeon, or a follower of one of the several specialties. He usually gains his evidentiary information from having examined or treated the party litigant for a non-fatal injury or disease.[5] The lawsuit arises as a Workmen's Compensation claim, as a Tort

(3) Development of usable criteria and safeguards in respect to each type of evidence;
(4) Promotion of complete understanding among courts, lawyers and experts of the pitfalls and potential errors of each species of evidence in order to enable wise cross-examination;
(5) Development of appropriate legal mechanisms and modes of trial;
(6) Repression of preconceptions and psychological predilections in the trial process and accentuation of the logical and scientific aspects of evidence. See Smith, H. W., Components of Proof in Legal Proceedings, (Feb. 1942) 51 Yale L. J. 537.

[5] On occasion he may derive his opinion from examinations first made in the course of preparing himself to testify in court. Still again, under our practice, if he is properly qualified, he may express an expert opinion on the basis of hypothetical questions put to him by counsel, even though he has no personal knowledge of the case.

action for personal injuries, as a proceeding under a Life, Health or Accident Insurance policy, or in connection with some problem of status. Occasionally the suit is a wrongful death action, but in practically all cases the objective of the moving party is to recover compensation for alleged injury.

As long ago as 1909, 60 per cent of the cases tried in Superior Court in Suffolk County, Massachusetts, involved expert testimony. I dare say the percentage tends constantly to rise. Personal injury litigation accounts for a large fraction of these cases, but not for all of them. Practicing physicians have long been going to court as witnesses in actions brought to set aside wills or deeds for alleged mental incapacity at the time of execution, or to testify in criminal proceedings on the subject of the defendant's mental responsibility, or perhaps to give some influential finding or opinion based upon expert study of evidentiary problems.

1. The Problem of Expert Testimony. These impacts of law and science have given rise to thunderous reports emanating from the blacksmith shop and showers of sparks capable of burning the unwary. It is explained on the one hand that the sledge hammer of science is being used to hit glancing blows, or that it is an inadequate tack hammer not sufficient to beat out the metal. It is said by others that the anvil of law is slippery, or too narrow, or not made right to accommodate the materials upon which science must work.

The truth here does not lie within range of any single naïve explanation. Part of the difficulty arises from stupid or antiquated rules of evidence. In many states, as a result of ill conceived "privileged communication" statutes, an unscrupulous patient can obstruct justice by closing the mouth of his doctor on the witness stand.[6] In most states, the hearsay rule has been carried too far. In others the cause of Scientific Proof has been obstructed by holding that taking involuntary body fluid or blood specimens violates the constitutional guarantee against self-incrimination or against unlawful search and seizure.[7] These major vices in technical rules of evidence will soon go down before the frontal attacks of progressive legal scholars.[8]

Part of the difficulty in utilizing expert testimony springs from inadequate legal mechanisms. The lay jury is not qualified to determine scientific issues and much of the continuing friction springs from this maladjustment of the trier of fact to the questions he decides. Rather than play upon each independent defect, I prefer to consider the current position of expert testimony in its broader aspects and with particular reference to mechanisms of trial.

[6] *Chafee, Privileged Communications: Is Justice Served or Obstructed by Closing the Doctor's Mouth on the Witness Stand? ANN. INT. MED., 1943, xviii, 606, 53 Yale L. J. (April 1943) —.

[7] *Ladd and Gibson, Legal-Medical Aspects of Blood Tests to Determine Intoxication, ANN. INT. MED., 1943, xviii, 564, 29 Va. L. Rev. (April 1943) —.

[8] *Morgan, Suggested Remedy for Obstructions to Expert Testimony by Rules of Evidence, 2 Clinics (April 1943) 1627, 20 U. of Chi. L. Rev. (April '43) —. See, also, Chafee, *supra*, note 6, and Ladd and Gibson, *supra*, note 7.

One must consider the nature of the ailment before he can specify the remedy. At the present moment, the doctor who goes to court as a witness is made a participant in a fast-moving adversary proceeding where a premium is put on quick thinking and categorical responses, and the devil usually gets the hindmost. If he shows a respectable doubt, his testimony is "conjectural"; if he is naïve, he may be trapped; if he has not the precious power of simplification, and the benefit of jury neutrality or sympathy, he may be misunderstood or misbelieved. If he is an expert on internal medicine, he may have to stand collateral cross-examination on the configurations of the tibia or some other bone which has no relation to his proper testimony. He may have to conform what should be a conditional answer to a "yes" or "no" because of the pernicious hypothetical question system.[9] The medical man is primarily interested in treating and healing and is accustomed to having his opinions received with deference and respect. If, as it is said, 5 per cent of doctors now do most of the testifying in court, it is no matter for surprise.

Free selection of medical experts by parties litigant has tended to encourage "shopping around" for favorable experts, and this partisan bias is often more subtle than outspoken. Courts have plodded along, quite willing to recognize any holder of an M.D. degree as a universal expert on science. This naïveté is surprising, for the same judge who rules a general practitioner competent on his qualifying or voir dire examination, will take the train for Mayo Clinic if he stands in personal need of specialized surgery.

The truth is that Legal or Forensic Medicine calls for a type of knowledge and opinion that is often peripheral and new to the doctor's way of thinking. He has observed conditions and studied medicine principally in terms of therapeutics. He may have no justifiable opinion as to whether injury can produce a certain disease or as to the terminal effects in point of disability. If he has gone to court to accommodate an old patient, and is qualified on voir dire examination as a thoroughgoing expert, he may find it hard to confess the limits of his knowledge.

Suggested Remedies. How can these chasms be closed?

(1) The Need for Expert Referees.

The relation of injury to disease (proximate causation), and the assessment of terminal disability (fixing damages), pose scientific problems which should be settled by expert referees, medical specialists drawn from select panels. No lawyer need fear his immolation with advent of this change, for he would still participate in the informal hearings of the referees and have opportunity for his witnesses to be heard. The adversary system would be preserved, but with heavier accent on discovery of the true facts. Litigants could be hospitalized by the referee, examined by him or any of his nominees

[9] In the Tuckerman will contest, tried before Judge McKim in Suffolk Probate Court (Mass.), attorney Robert M. Morse put to Dr. Jelley, a psychiatrist, what is reputed to be the longest hypothetical question on record. It concerned the mental condition of the testator, contained twenty thousand words and required three hours to propound. The witness answered: "I don't know." (April 1907) 5 Ohio L. Rep. 45.

and studied with scientific precision. The referee could be twins: a doctor and a lawyer acting together to see that evidence was fully developed while protecting fair hearing to the parties and the substance of major rules of evidence. All observations and findings would be reported in a "record," with conclusions listed in a separate section so as to permit review of the medical evidence. This review should be made by an appropriate medical expert serving as adviser to the trial judge when the latter has the medical record presented to him for "confirmation." Once confirmed, the medical findings should be final and not subject to disturbance by an appeal court. Confirmations could be resisted or set aside on grounds of fraud, accident, or mistake, but here the trial judge would lean on his medical adviser. It is eminently desirable to curtail review of medical findings to the trial court where proper access can be had to the litigant for reëxamination.[10]

This device seems to be the ultimate goal of American jurisprudence. It would soon break the hold of mere advocacy and of shabby or ill-informed testimony. It would leave doctors to judge the testimony of doctors, eliminate futile efforts of the expert to descend to the lay juror's comprehension, and whet the interest of all socially minded doctors in the judicial process. The chief barriers to its realization are constitutional guarantees of jury trial.[11] The prospect of speedy reform is diminished by possible resistance of plaintiff's lawyers, but this fear should give way once the trial lawyer realizes that substantial verdicts will still be obtainable for genuine injury, but that claims based on fraud and malingering will be sifted out.

(2) Transitional or Mid-Way Reforms Not Involving Constitutional Amendment.

A. Impartial experts appointed by court.

A transitional reform is some variety of statute which authorizes a trial judge to appoint an impartial and qualified man or commission to investigate the physical condition or mental status of a party litigant. Such appointee acts as an officer of the court, and not as a privately employed expert. The device helps escape partisan pressure, gives the trial judge a chance to bring in authoritative consultants, and in several directions protects the purity of proof. It has the defect of keeping lay jurors as final arbiters of scientific

[10] This device would permit a much closer surveillance of the excessiveness or inadequacy of monetary awards. The present appellate practice of determining whether the judicial conscience is "shocked," by looking to see what other courts have upheld in supposedly similar cases at other times and places involves several undesirable factors. It is not possible to make "book comparison" of any but the simplest injuries.

[11] Due process clauses, properly construed, require only a fair and regular mode of procedure and trial, and this need not be by jury. Abolition of grand jury indictment in criminal cases does not violate the due process clause of the Federal Constitution (Art. XIV: "Nor shall any State deprive any person of life, liberty or property without due process of law"), if the substitute procedure of prosecution on information is designed to give the accused a fair hearing. *Hurtado v. People of California,* 110 U.S. 516 (1884).

As to whether jury trial can be validly dispensed with in the trial proper of a criminal case, however serious the offense, see McGovney, Cases on Constitutional Law, (2d ed.) (1935), n. on p. 568.

Most state constitutions have specific provisions which operate to preserve the right to trial by jury in cases in which it existed at common law.

issues. It is shocking for the layman to hear that in many of our states as in Texas,[12] a trial court cannot appoint an impartial expert in a personal injury case to examine an unwilling plaintiff. Such a claimant can carry his case through court, to what may be a large verdict, with the defendant unable to secure independent confirmation of the reality and extent of injury. Fortunately the majority view is contrary, whether reached by common law, by statute, or under reformed rules of civil procedure such as those promulgated by the United States Supreme Court under a Congressional enabling act of 1934, for governance of the Federal District Courts.[13]

Massachusetts, one of the first states to provide for pre-trial examination of psychiatric cases by impartial experts,[14] has found this method goes far to cure old evils.[15]

B. Certification of expert witnesses by medical profession as aid to "voir dire" examination.

The medical profession itself can add some straws to this broom. One who proposes to use a witness as an expert must establish his qualifications by preliminary questions. Opposing counsel may cross-examine the alleged expert to test his claims to special knowledge. At the conclusion of this voir dire examination, the trial judge must say whether the witness is a properly qualified expert, and his ruling will not be set aside except for substantial abuse of discretion. The medical profession itself could issue certificates of competency to its several members in respect to testimonial qualifications. If a general practitioner appeared in court as an authority on neurosurgery, a little probing would soon show that his own profession did not regard him as a proper expert witness on that subject. The intelligent trial judge, on conclusion of the voir dire examination, could rule the proffered witness incompetent with little fear of reversal by an appeal court.[16] Even if the witness were allowed to testify, the lack of a certificate would be a proper subject for comment in arguing upon the weight which the jury should accord his testimony. No statute would be necessary to enable this salutary innovation, although legislation would be preferable empowering state licensing boards to issue such certificates after due hearing. In no case should the doctor who personally examined or treated a patient be debarred

[12] *Austin & N.W.R.R. v. Cluck*, 97 Tex. 172, 77 S.W. 403 (1903). This is not because a defendant has no right to the evidence, says the court, but because no legal sanction exists for compelling plaintiff to submit; silence of English common law is inferentially against such a jurisdiction, Texas statutes or constitution do not confer it, and a trial court cannot acquire it by implication from necessity. The spirit of the constitutional guarantee against unreasonable search would be violated.

[13] U. S. Code Ann., Title 28, section 723c: Federal Rules of Civil Procedure for the District Courts of the United States. Preparation authorized: Act of June 19, 1934, c. 651, 48 Stat. 1064; put into effect Sept. 16, 1938.

[14] Acts and Resolves of Massachusetts, 1921, ch. 415; Ann. Laws of Mass. (1942), C. 123, section 100 A. (The so-called "Briggs" law.)

[15] Overholser, The Briggs Law of Massachusetts: A Review and an Appraisal, (1934–35) 25 J. Crim. L. & Crimin. 859–883.

[16] Even if initially he has ruled the witness competent, the trial judge may reverse his ruling in the course of trial and intercept further questions when the trend of testimony shows the alleged expert to be incompetent. *Carbonneau v. Lachance*, 307 Mass. 153, 29 N.E. (2d) 696 (1940).

from testifying. The prime purposes of the certificate method would be to grade competency and to exclude unqualified persons from giving opinion evidence as to the meaning of facts said to have been discovered by others.

C. Surveillance of expert testimony by professional "auditing" committee.

At the moment some medical witnesses are venturing opinions in court which they would not assert before medical societies. This double standard, when it exists, deprives courts of the scientific light they should have. When a doctor testifies that the moon is made of green cheese, as occasionally happens, he is either dishonest or ignorant, and needs to be disciplined by his professional brethren. In the past there has been no proper surveillance. Civil trials are attended by little or no publicity, and the improper medical witness has not had to face the just light of competent criticism.

Let it be said that all people competent to speak recognize that medicine is not an exact science, in its totality, but a mixture of science and art. There is much room for honest difference of opinion and for varying clinical judgments on open subjects. No one would hold all witnesses to subscribe to a single view in cases where good men may differ. But at last we come to outer limits of these justifiable differences, and no man is entitled to palm off as certainty what medical science itself knows to be purely conjectural and as yet without adequate proof, experimental or clinical. The test of improper testimony should be this: would medical men competent to speak on the subject in question consider the evidence given by Dr. X an acceptable view, scientifically, or would they consider it a prostitution of professional standards?

Each State Medical Society could appoint an auditing committee, including one member of the bar, to sample transcripts of medical testimony at periodic intervals in the medico-legal cases which reach the appeal courts. Witnesses found to have departed from professional standards would be subject to disciplinary action for cause, after due hearing, or to revocation or curtailment of their certificates as competent expert witnesses.

The mere presence of this real censorship mechanism would be as valuable as its actual use. It should be pointed out that surveillance of appeal records involves no improper probing or breach of confidence, for such documents are *public* records open to the freest inspection by any interested person.

D. Reformulation of medical science in terms of legal utility.

"Scientific Proof" does not imply that final answers are available for all medical problems which arise in court. All that we can expect to have is the benefit of the best evidence that the science of the given time can supply.

In times past the scientific accessions of medicine have been built largely on observations which have a therapeutic or curative implication. Even the great insurance companies cannot tell one how much the life expectancy of a person is shortened by the development of traumatic epilepsy following head injury. We have a great deal to learn yet about the general effect of

compromise settlements in curing or relieving traumatic neuroses.[17] By sympathetic team work, we must study large groups of patients from new points of view to acquire much information of legal value that we cannot now extract from medical books.

In this Symposium Series, medical men of undisputed authority have endeavored to lay down basic criteria in respect to many of these problems, in a manner acceptable to both professions.[18] In the future we shall be able to widen and lengthen this initial path with the great advantage to law and lawyers, and to expert witnesses.

2. Problems of Mental Responsibility: Rules in McNaghten's Case. In 1843, the House of Lords of the English Parliament called upon the learned judges to deliver an advisory opinion laying down proper tests for determining mental responsibility whenever a defendant prosecuted for homicide should raise the plea of insanity. The Lords addressed specific questions to the Judges. In the previous year McNaghten had been tried for killing Edward Drummond, whom he shot in the back, mistakenly believing he was firing upon Sir Robert Peel. Drummond was Peel's private secretary, and McNaghten was led to this violence by clearly substantiated delusions of

[17] *Solomon, H. C., and Smith, H. W., Traumatic Neuroses in Court, 99 Am. J. Psychiat. (May–June 1943), —, 29 Va. L. Rev. (April 1943) —.

[18] *Brahdy and Kahn, Clinical Approach to Alleged Traumatic Disease, ANN. INT. MED., 1943, xviii, 491, 23 B. U. L. Rev. (April 1943) —.

*Moritz, The Mechanisms of Head Injury, Ann. Surg., 1943, cxvii, —, 23 B. U. L. Rev. (April 1943) —.

*Denny-Brown, Factors of Importance in Head Injury, A General Survey, Clinics, 1943, ii, 1405, 29 Va. L. Rev. (April 1943) —.

*Munro, The Late Effects of Craniocerebral Injuries, A Consideration of the Criteria Necessary to Evaluate the Possible Causes, Ann. Surg., 1943, cxvii, —, 23 B. U. L. Rev. (April 1943) —.

*Ebaugh and Brosin, Traumatic Psychoses, ANN. INT. MED., 1943, xviii, 666.

*Solomon and Smith, *supra*, note 17.

*Marble, The Physician and the Workmen's Compensation Law, Clinics, 1943, ii, 1441. Not in a law journal.

*Schwartz, Problems of Proof in Claims for Recovery for Dermatitis, ANN. INT. MED., 1943, xviii, 500, 41 Mich. L. Rev. (April 1943) —.

*Aldrich, Forensic Aspects of Burns with Special Reference to Appraisal of Terminal Disability, 29 Va. L. Rev. (April 1943) —.

*Ober, Some Practical Criteria for Use in Forensic Orthopedic Cases, Clinics, 1943, ii, 1476, 15 Rocky Mt. L. Rev. (April '43) —.

*Homans, Circulatory Deficiency in the Extremities in Relation to Medico-Legal Problems, ANN. INT. MED., 1943, xviii, 518, 21 N. C. L. Rev. (April 1943) —.

*Pollock, Examination of Motor and Sensory Function as Related to Opinion Evidence, Clinics, 1943, ii, 1424, 53 Yale L. J. (April 1943) —.

*Wolff, The Pain Threshold in Man, 99 Am. J. Psychiat. (March–April 1943) —.

*Joslin, The Relation of Trauma to Diabetes, Ann. Surg., 1943, cxvii, —, 15 Rocky Mt. L. Rev. (April 1943) —.

*Hertig and Sheldon, Minimum Criteria Required to Prove Prima Facie Case of Traumatic Abortion or Miscarriage, 117 Ann. Surg. (April 1943) —.

*Bennett, Medical Criteria Which Govern Relations of Trauma to Joint Disease, Clinics, 1943, ii, 1448.

*Warren, Minimal Criteria Required to Prove Causation of Traumatic or Occupational Neoplasms (Cancer), Ann. Surg., 1943, cxvii, —, 20 U. Chi. L. Rev. (April 1943) —.

*Merritt and Solomon, Relation of Trauma to Syphilis of the Nervous System, Ann. Surg., 1943, cxvii, —, 23 B. U. L. Rev. (April 1943) —.

*Cobb and Smith, Relation of Emotions to Injury and Disease, Medicine, (May 1943), —, —, — Harv. L. Rev. (Summer 1943).

persecution. He was tried before Chief Justice Tindal, filed a plea of lunacy, and was acquitted by the jury, which returned a verdict of "Not guilty, on the ground of insanity." The case provoked so much discussion in high quarters that the judges were called upon to declare, for guidance of courts in future cases, what a defendant must prove in a homicide prosecution to establish mental irresponsibility for his act. With frank temerity and open reluctance,[19] the learned judges laid down certain principles regarding proof of mental irresponsibility sufficient to constitute a defense to a charge of murder (or other crime):

(1) ". . . The jurors ought to be told in all cases that: every man is to be presumed to be sane, and to possess a sufficient degree of reason to be responsible for his crimes, until the contrary be proved to their satisfaction";

(2) ". . . To establish a defense on the ground of insanity, it must be clearly proved that, at the time of the committing of the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing: or, if he did know it, that he did not know he was doing what was wrong";

(3) As to ". . . persons who labour under such partial delusions only (i.e. in respect to one or more particular subjects or persons), and are not in other respects insane, we are of opinion that, notwithstanding the party accused did the act complained of with a view, under the influence of insane delusion, of redressing or revenging some supposed grievance or injury, or of producing some public benefit, he is nevertheless punishable according to the nature of the crime committed, if he knew at the time of committing such crime that he was acting contrary to law." [20]

The rules laid down failed altogether to provide for certain contingencies:

(1) The justices did not recognize "irresistible impulse" or inability to refrain from the criminal action indulged, as any defense, so long as the actor still retained the ability to distinguish right from wrong.

[19] The House of Lords had debated the subject of insanity as a defense to murder (March 6 and 18, 1843; see Hansard's Debates, vol. 67, pp. 288, 714); this led to a resolution to call upon the Judges for an advisory opinion, an extremely rare practice in English law, but not without precedent. The judges were required to frame their answers to specific questions, without benefit of argument by counsel, without hearing medical testimony and with but a short time for deliberation. Surely no more profound precedent was ever laid down in a law court on a flimsier foundation. It is to the credit of the judges that they were skeptical about their assignment. Mr. Justice Maule (one of the judges) said, 10 Clark & Finnelly, 203, at 204:

"I feel great difficulty in answering the questions put by your Lordships on this occasion:—First, because they do not appear to arise out of and are not put with reference to a particular case, or for a particular purpose, which might explain or limit the generality of their terms, so that full answers to them ought to be applicable to every possible state of facts, not inconsistent with those assumed in the questions: this difficulty is the greater, from the practical experience both of the bar and the Court being confined to questions arising out of the facts of particular cases:—Secondly, because I have heard no argument at your Lordships' bar or elsewhere, on the subject of these questions; the want of which I feel the more, the greater are the number and extent of questions which might be raised in argument:—and Thirdly, from a fear of which I cannot divest myself, that as these questions relate to matters of criminal law of great importance and frequent occurrence, the answers to them by the Judges may embarrass the administration of justice, when they are cited in criminal trials. . . . I shall proceed to give such answers as I can, after the very short time which I have had to consider the questions, and under the difficulties I have mentioned; fearing that my answers may be as little satisfactory to others as they are to myself."

[20] McNaghten's Case (House of Lords) 10 Clark and Fin. 200 (1843).

(2) The concept of attenuated responsibility was not recognized and the psychopathic personality was entirely ignored.[21]

English courts steadfastly continue to pay lip-service to McNaghten's rules. Most American courts have done likewise, except for those jurisdictions which have broadened the original categories to include the further exculpatory ground of irresistible impulse of one kind or another.

These rules, pronounced with misgivings, did a great deal to sabotage law-medicine relationships. A host of psychiatrists such as Emil Kraepelin (1856–1926) advanced the description of clinical entities in the field of psychiatric disorders. The rules in McNaghten's case remained static. They were assaulted by such psychiatrists as Maudsley and criticized by such criminal law writers as Stephens. They were studied by Select Reform Committees in England and impugned in America by Sheldon Glueck [22] and other criminologists.

There is no doubt that several sharp arrows can be shot at this target. It is erroneous to assume that one can abstract single mental faculties in judging mental health. Delusions should be regarded as a general symptom of mental disorder and not be given limited evidentiary value. Inability to abstain from wrongful conduct runs to volition itself and is as basic as inability to form a moral judgment. The criminal law has always

[21] The reader may suppose that the psychopathic personality had not then been recognized as a psychiatric entity, but medical men in England as early as 1829 had demarcated the condition from irresponsibility or insanity due to disease.

Sampson, in his Criminal Jurisprudence in Relation to Mental Organization, London (1841) at p. 7 had said:

"In the Richmond Lunatic Asylum, Dublin, Mr. GEORGE COMBE saw a patient, in 1829, who had been confined for ten years. He exhibited a total want of moral feeling and principle, yet possessed considerable intelligence, ingenuity, and plausibility. He had been a scourge to his family from childhood—had been turned out of the army as an incorrigible villain—had attempted the life of a soldier—had been repeatedly flogged—and had since attempted the life of his father. Respecting this man, Dr. CRAWFORD, Substitute Physician at the Asylum, made the following remarks. *'He never was different from what he now is; he has never evinced the slightest mental incoherence on any one point,* nor any kind of hallucination. It is one of those cases where there is great difficulty in drawing the line between extreme moral depravity and *insanity,* and in deciding at what *point* an individual should cease to be considered as a responsible moral agent, and amenable to the laws. The governors and medical gentlemen of the Asylum have often had doubts whether they were justified in keeping him as a *lunatic,* thinking him a more fit subject for a bridewell. He appears, however, so totally callous with regard to every moral principle and feeling, so thoroughly unconscious of ever having done any thing wrong, so completely destitute of all sense of shame or remorse, when reproved for his vices or crimes, and has proved himself so utterly incorrigible throughout life, that it is almost certain that any jury before whom he might be brought, would satisfy their doubts by returning him *insane,* which in such a case is the most humane line to pursue. He was dismissed several times from the asylum, and sent there for the last time for attempting to poison his father; and it seems fit he should be kept there for life as a *moral lunatic:* but there has never been the least symptom of *diseased* action of the brain, which is the general concomitant of what is usually understood as *insanity.* This, I consider, might with propriety be made the foundation for a division of lunatics into two great classes,—those who were insane from *original constitution,* and never were otherwise; and those who have been insane at some period of life from diseased action of the brain, either permanent or intermittent.'"

Benjamin Rush, father of American mental science, was one of the first to point out that disorders of the moral sentiments may be congenital and equivalent to partial imbecility, and he suggested that "moral imbecility" better described such cases than did the term "moral insanity." Rush, Medical Inquiries and Observations Upon the Diseases of the Mind, Phila. (1812).

[22] Glueck, Mental Disorders and the Criminal Law (1925).

required a "mens rea," or bad state of mind, as an ingredient of felonies, and some voluntary act to which moral culpability can be attached. It was anomalous from the start that irresistible impulse should have been excluded from McNaghten's rules.

The more difficult exercise is not to assault these old and vulnerable redoubts, but to explain why and how they have been able to withstand capture for so long. It would be a grievous error to assume that men of law have been obstinate or obtuse. Sir Matthew Hale (1609–1676), Lord Chief Justice of the Court of King's Bench in England, wrote on lunacy long before McNaghten's rules were pronounced. He was keenly aware of the subtle gradations in mental responsibility. Indeed, he said:

". . . It is very difficult to define the invisible line that divides perfect and partial insanity; but it must rest upon circumstances duly to be weighed, and considered both by the judge and jury, lest on the one side there be a kind of inhumanity toward the defects of human nature, or on the other side too great an indulgence given to great crimes." [23]

The great English judges were almost all recruited from among the leading trial lawyers. They were men with a grasp of practical affairs, and doubtless many of them had dinner companions among the eminent medical men. We cannot believe that they had no inkling of the disparity between the legal and medical approach to mental disease. The truth is that McNaghten's rules are not philosophical concepts, but mere products of the mode of trial under our adversary system. Lay jurors have long had the responsibility of passing upon the weight and credibility of expert testimony.[24] This they do under a proper charge delivered by the trial court at

[23] Hale, The History of the Pleas of the Crown (1736).

[24] In Roman law we find evidence that scientific issues were referred to expert referees for decision. See Dig. 25.4.1 pr. where the case was as follows:

[Rutilius Severus declared that his wife, who had divorced him, was pregnant. This she denied. Rutilius wanted to claim the child when it was born. Apparently his wife did not want him to do so and for that reason denied that she was pregnant.]

"Rutilius Severus seems to desire a new thing in applying for a custodian for his wife, who divorced herself from him and alleges that she is not pregnant; and so nobody will wonder if we also suggest a new counsel and remedy. Therefore if he persists in the same demand it is most convenient to choose the house of a most respectable woman in which Domitia shall come, and there three midwives of proven skill and honesty, who will be selected by you, shall inspect her. And if indeed all or two shall report that she appears to be pregnant, then the woman shall be persuaded that she accept the custody as if she herself had demanded it. But if she does not give birth the husband may know that it pertains to his odium and reputation that not undeservedly he may seem to have attempted this as some kind of an insult to the woman. But if all or most report her not to be gravid (pregnant) there will be no cause for custody." Rescript of the Emperors Marcus Aurelius and Lucius Verus to Valerius Prisicianus, urban prefect (161–169 A.D.).

In the time of Gordian (238–244 A.D.) we find this provision:

"To soldiers once dismissed for cause, readmission on the ground of recovery of better health is not customary since they are not carelessly dismissed but only those who are found to have acquired a defect according to the report of physicians and also on the diligent investigation of a competent judge." C. Just. 12.36.6.

It was further provided that in case doubts arose as to the authenticity of deeds, it should be necessary to compare the handwriting of the subscribers. Nov. 73.7 pr. (A.D. 538).

References to use of experts in the Roman legal texts can be found in Wetzell, System des Ordentlichen Civilprocesses (1878) 528, n. 11.

In Canon Law it has long been customary for the judge in matrimonial cases involving alleged impotency or non-consummation of the marriage, to establish the facts by ordering

the close of the case, shortly before they retire to the jury room to consider their verdict of "guilty" or "not guilty." Before a lay judge can frame an intelligible charge for the guidance of lay jurors, he must be able to carve out some rule-of-thumb classifications or categories which these jurors can apply to the evidence to be valued. Immediately we import a forced certainty of statement into a realm which is essentially uncertain and variable.

This practical problem of proof has much to do with the unwillingness of English courts to embrace the doctrine of irresistible impulse. There is no doubt that violent disappointments in love and other psychological pressures can drive a person to inhuman conduct as irresistibly as disease, as Louis Proal, the French judge, so brilliantly showed in his "Passion and Criminality." [25] But English courts have been afraid to get out on these uncharted seas, where all criteria are dim, and degrees of responsibility are not provable by objective evidence. They have not paid so much regard to the paralysis of volition as to the suspected tinge of culpability in allowing oneself to take the first step. Thus, one who voluntarily partakes of alcohol and kills in a drunken rage may, if he lacked the required malice aforethought or specific criminal intent, have his offense mitigated from first to second degree murder or to manslaughter, but in most jurisdictions he cannot set up his drunken state as a complete defense and thereby gain acquittal.[26] If his voluntary intoxication leads to the independent disease of delirium tremens, and as a result of an automatic state induced thereby, he kills another, he has a complete defense.[27] The culpable first step has merged

bodily inspection of one or both parties by court-appointed experts. See Gasparri, Codex Juris Canonici (1918 ed.).

Canon 1792: "The service of experts must be employed whenever the law or the judge demands their interrogation and opinion for the purpose of establishing some fact or determining the true nature of the thing."

[This canon apparently originated in the Decretals of Pope Gregory IX (1145–1241). The Decretals were drawn up between 1230–1234 A.D.]

The early common law provided a writ for a jury of matrons *de ventre inspiciendo* in proper matrimonial causes (Bracton, De Leg. lib. ii fol. 69).

Indeed, throughout the fourteenth century in London, courts used special juries of experts drawn from a particular trade to hear causes involving trade disputes. See, Riley, Memorials of London and London Life in the 13th, 14th and 15th Centuries (1868).

In 1345, an English court, in an appeal of mayhem, called London surgeons to help them determine whether a wound was fresh. Anonymous, Lib. Ass. 28 pl. 5 (28 Edw. III).

These facts are the more significant when we realize that the jurors originally heard no witnesses and were themselves free to go about investigating the facts both before and during trial. It was not until the middle of the 15th century that it became customary to summons witnesses. It was not until after 1600 that the direct and influential use of experts began to succumb to the present evidentiary restrictions, with the result that scientific proof became merely advisory to the lay jury, and reduced to the status of open competition with lay testimony. The foregoing English cases, and others, are mentioned in Hand, Historical and Practical Considerations Regarding Expert Testimony, (1901) 15 Harv. L. Rev. 40.

Any trend forward, anachronistically, must be a trend backward, to the more direct mechanisms which the law had prior to 1600.

[25] Proal, Passion and Criminality, published by Charles Carrington, 13 Faubourg, Montmartre, Paris.

[26] Singh, History of the Defense of Drunkenness in English Criminal Law, (1933) 49 L. Qu. Rev. 528. For American decisions see E. V. R., Intoxication in Mitigation of Homicide, (Sept. 1941) 2 Qu. J. Alcohol 396.

[27] *Regina v. Davis* (Northeastern Circuit, Newcastle-upon-Tyne), 14 Cox C. C. 563 (1881). Trial before Justice Stephen, the same Sir James Stephen famous for his "History of the Criminal Law" (1883).

into a disease state which human agency cannot control, and furthermore there is a guarantee of authenticity when the aberrant mental state is a familiar symptom of a standard disease.

One cannot fairly say that currently the English courts reject "irresistible impulse" in toto; possibly that defense has full vitality in England in all cases in which transient mania, or irresistible impulse, is the explosive symptom of an ascertainable, preëxisting disease such as delirium tremens, epilepsy, or one of the psychoses.[28] It is at the brink of mere psychologic motivation that the English courts draw back, and there is much to be said for their hesitancy if we orientate rules by practical considerations of sound proof-making.

The conflict we have here between current law and good psychiatry does not arise from obtuseness of the legal mind, nor from any desire of law to poach upon medical preserves, but from understandable consequences of trial by jury. Assume lay jurors are to continue trying scientific issues, and you will find a natural and understandable hesitancy about giving up the pat, albeit, illusory certainty of McNaghten's rules. Arrange for lunacy problems to be delegated to psychiatrists acting as expert referees, and this delegation will draw after it a conceded right to erect new criteria suitable to guide the new trier of fact. In the judicial process, definitions have but one function—to serve as sign posts for the trier of fact. Those who would destroy McNaghten's rules should make a flank attack rather than a frontal assault, by seeking legislation designed to make the accredited psychiatrist an expert trier of fact in lunacy issues.

When we turn to the law in action in England, we discover that McNaghten's rules do not work oppressively as against a particular defendant. One would imagine that few prisoners could prove a defense of lunacy. In practice the fact is otherwise, and it would appear that the jury uses its verdict of "guilty, but insane" in a generous manner, sometimes to save from capital punishment prisoners not believed to be free agents or grossly culpable in committing the crime. Mr. Justice Darling recognized that juries use this verdict as an escape device when he pointed out that in many criminal asylums there are defendants ". . . as sane as the Judges who tried them."

"147. From a table issued by the Committee on Insanity and Crime, appointed in 1922, we find that, taking the figures for the 22 years 1901 to 1922, the number of persons on trial for England and Wales on murder charges was 1,445, of which 134 were found insane on arraignment and 351 were found guilty but insane, being a total percentage of 9.273 insane on arraignment, and 24.292 guilty but insane, or 33.663 per cent in all insane. . . .

[28] Frequently these cases involve such "automatism" as to deprive the actor of knowledge of "the nature and quality of his act," or the mental state is such that experts do not hesitate to say that the accused was unable "to distinguish right from wrong." Opinions of the higher English courts have not yet covered irresistible impulse, as a third category, in a satisfactory or definitive way. Yet we cannot overlook the fact that in 1924 the House of Lords defeated Lord Darling's "Criminal Responsibility (Trials) Bill" intended to establish irresistible impulse due to mental disease as an additional legal defense.

"148. Coming to Scotland, we find that, in the 20 years, 1910 to 1929, 249 persons were indicted and brought to trial for murder, of whom 22 were found guilty of murder, 104 of culpable homicide, and 23 of other crimes; 41 were found insane in bar of trial, and 9 at time of act, while 49 were assoilzied. Those declared insane were thus 20 per cent of those indicted." [29]

It would be an interesting experiment to subject these cases to independent psychiatric study, to determine how many of these acquitted persons actually are insane. If only 10 per cent should be found to be so, the only significance would be that 23 per cent of this group have been committed to asylums rather than to the hangman, for in England, since 1800, an acquittal on the ground of insanity makes the defendant subject to consignment to an asylum "during His Majesty's pleasure." [30]

Assume that a defendant has been convicted by a jury due to literal application of McNaghten's rules. Since the Criminal Appeal Act of 1907 [31] the English Court of Criminal Appeal has had power to hear new evidence in reviewing the conviction,[32] and the further power to substitute the jury's verdict.[33] The Court has exercised this jurisdiction sparingly, but it is a not uncommon thing for the Court in affirming the conviction within the framework of McNaghten's rules to invite intervention by the Home Secretary.[34] Under the Criminal Lunatics Act, 1884,[35] the Secretary of State (Home Secretary) is empowered after conviction and before execution of sentence to intervene, appoint a committee of medical men to examine into the prisoner's present sanity, and to substitute commitment in an asylum in lieu of the court penalty. In this investigation, the medical men apply psychiatric standards as they would in studying any other case recommended for commitment under a lunacy certificate. We now have the somewhat farcical spectacle in England of courts paying continued lip service to McNaghten's rules because of respect for precedent and practical problems of proof raised by jury trial, while inviting an auxiliary administrative agency to step in and apply modern psychiatric tests after the court is done!

Unfortunately in many American states we have not been so adroit in developing escape mechanisms for McNaghten's rules; most often we have

[29] Report from the Select Committee on Capital Punishment, House of Commons (1929–30) 36. Printed by H. M. Stationery Office (1931).

[30] Before 1800 in England, an acquittal on the ground of insanity would enable the defendant to go free without any protection for society. The "Criminal Lunatics Act" of 1800, in England, provided that a jury, in acquitting a defendant accused of felony, must make it clear whether their action were taken because they found the accused person was insane at the time he committed the act. If so, the defendant was committed to an asylum and detained "during His Majesty's pleasure." The special form of verdict, "guilty, but insane" was specified by the "Trial of Lunatics Act" (1883) s. 2.

[31] 7 Edw. 7, c. 23.

[32] Exercised in *Rex v. Holt* (Crim. App.), 15 Cr. App. R. 10 (1920).

[33] As in *Rex v. William Hopper* (Crim. App), 11 Cr. App. R. 136 (1915). Defense: accident; jury verdict: murder; substituted verdict entered on appeal: manslaughter, with sentence reduced to four years' penal servitude. In *Rex v. Beard* (Crim. App.), 14 Cr. App. R. 110 (1919), D while intoxicated raped a girl and apparently strangled her to death by accident. Jury verdict of murder, reduced on appeal to manslaughter because of error in trial court's charge.

[34] As in *Rex v. Lumb* (Crim. App.), 7 Cr. App. R. 263 (1912); *Rex v. Boss* (Crim. App.), 16 Cr. App. R. 71 (1921).

[35] 47 & 48 Vict., c. 64.

preserved the facade without eroding away the substance. The time has come in both countries for recognizing psychiatric appraisal of court cases as a problem to be farmed out to expert referees.

I must not leave this subject without subscribing to the belief that the "trial-defense-acquittal" formula is fundamentally erroneous. Culpability or fault was a cardinal juridical concept of the past two centuries, but it is steadily shrinking in authority as a touchstone of legal thinking. In the field of criminology, "danger to society" is the more important consideration.[36] The defendant who shows attenuated responsibility, the weakling who gives way to "irresistible impulses" in response to ordinary social stimuli, the psychopathic personality, whose whole reaction to life is tragically warped, sometimes in the most cruel and sadistic ways—these persons cannot scientifically be *punished* as free agents; they cannot, as a rule, be salvaged for "open" society by reform, and they are better looked upon as special psychiatric cases too dangerous to remain at large. The test of culpability or fault in committing the crime has no real meaning in the presence of one of these permanent personality defects.[37] Our preoccupation must be with early discovery of these pre-delinquents and the making of more certain arrangements to segregate and control them.[38] To protect innocent members of society against their violent crimes calls as much for preventive methods as for mere permanent detention after the heinous crime is done.[39]

3. Medical Criminology and Penology. Physicians have had a conspicuous part in the ceaseless probing and questing for the basic causes of crime.[40] It would seem now that multiple factors are usually involved in the pathogenesis of a criminal career. Biological factors or actual disease may play an insignificant or an important rôle in a particular case.[41]

[36] In master-servant cases, Workmen's Compensation Laws have substituted "injury from accident arising in the course of employment" as the basis of liability in lieu of the employer's negligence.

In the field of Domestic Relations, many states now permit divorce where the two spouses live apart for a statutory period, without regard to any fault of either. Still other jurisdictions have provided by statute that continuing insanity of one spouse arising after the marriage ceremony is ground for divorce.

As insurance against the perils of life becomes a social function, fault as a risk-fixing device will be much eroded, if not destroyed. If, as and when that phase is reached, we may still expect as a matter of social policy, that one who wilfully injures himself will be debarred from recovering compensation.

[37] Capital punishment in such cases is inappropriate, but as the psychopathic personality is not technically insane under McNaghten's rules, executive clemency is necessary to change the death penalty to life imprisonment. Governor Ritchie of Maryland saved Herman W. Duker, a psychopathic murderer, from capital punishment by such last-minute intervention. Ulman, A Judge Takes the Stand (1936), Appendix, p. 273.

A more recent case, in Massachusetts, was that of Woodward, a psychopathic juvenile, who killed a young girl by slow torture, and escaped the supreme penalty, after conviction of murder, only by last minute commutation of his sentence to life imprisonment.

[38] See Thom, Irresponsibility of Juvenile Delinquents, Am. Jr. Psychiat., 1942, xcix, 330.

[39] For prolonged studies along this line, from which the authors derive a formula of "predictive factors" intended to guide juvenile courts, see Sheldon and Eleanor Glueck, Juvenile Delinquents Grown Up (1940). (Based on statistical studies of 10 year records of 1,000 cases.)

[40] See Fink, Causes of Crime. Biological Theories in the United States, 1800–1915 (1938).

[41] Dr. Francis Joseph Gall (1758–1828) has been described as the founder of criminal anthropology. His discoveries in the anatomy of the brain won the highest praise of both

Despite the deep interest of lawyers and doctors in these subjects, there has been no national law passed providing for uniform examinations, consistent classification of offenders, or centralized collection of statistics. Even in the detailed judicial statistics of England one cannot find such data. There is a need, too, for the medical penologist, for studies of prison populations should go beyond etiology of crime to the formation of enlightened decisions regarding proper segregation of prison inmates and their fitness for parole.[42] At the moment, no one test or examination seems adequate to provide the desired personality blueprint, and improvement of methods is one of the central problems in this field.

In going through medical literature, one observes certain recurrent flaws in many studies dealing with relation of mental defect to crime:

(1) The investigator often fails to enumerate associated mental defects. A recent patient in Boston City Hospital, who had been in prison several times, was a chronic epileptic, suffered from delirium tremens from long indulgence in alcohol, and was a psychopathic personality. Each of these defects has an independent relation to criminal propensity, and it would be misleading to list the subject merely as an epileptic.

(2) In some cases a proper doubt may arise as to the adequacy of the test methods.

(3) Frequently the investigator does not correlate the particular defect or mental state with commission of the crime. To be considered significant in point of etiology, the defect should have been a substantial cause of the dereliction.[43]

Bischoff and Cuvier, but it was his bad fortune to be remembered principally for his rapidly discredited theories of phrenology.

Cesare Lombroso had attained to a position of eminence by the end of the last century through his anthropological investigations of criminals. He described various anomalies in the brains of criminals, but he failed to control his studies, and did not realize that brains of normal, law-abiding citizens show similar anomalies. Virchow predicted that his work would one day fall into low esteem as compared with the broad general contributions of Gall. Dr. C. B. Griffiths, Charles Goring, and other English prison medical officers systematically measured 3,000 subjects under direction of Professor Karl Pearson, using certain controls. In their published results in 1913 they said: ". . . Our inevitable conclusion must be that there is no such thing as a physical criminal type." Interest in the anthropological approach more broadly conceived has been freshly stimulated by the careful researches of Dr. Earnest A. Hooton, Professor of Anthropology at Harvard.

Phillipe Pinel (1745–1826) attacked problems of criminality from the vantage point of an alienist, as did Esquirol (1722–1840) the French psychiatrist. The latter produced in 1838 his well-known treatise, "On Mental Diseases in Their Medical, Hygienic, and Legal Relations." Maudsley and Mercier in England continued to study the relation of crime to insanity, and in America we have had several hundred studies devoted to the relation of mental defect to criminality. Some investigators have studied the I.Q.'s of prison populations, others have combined such psychometric methods with detailed medical examination and psychiatric diagnosis.

[42] For an excellent study of this type, see Branham, The Classification and Treatment of the Defective Delinquent, (1926) 17 J. Crim. L. & Crim. 183. For an important earlier study, see Glueck, Bernard, A Study of 608 Admissions to Sing Sing Prison, (1918) 2 Mental Hygiene 85. Rockefeller Foundation has carried out important surveys of prisoners in various institutions of the several states.

[43] A model study in this regard is the critical analysis by Dr. W. Norwood East of the main and subsidiary causes of attempted suicide, based on his personal examination and investigation of one thousand consecutive cases admitted to Brixton prison, in England. Dr. East found the major causes and motivations of attempted suicide to be as follows: 1. Alco-

It is safe to say that mental disease is very rarely a sole cause of criminality. As Dr. A. Warren Stearns, the experienced forensic psychiatrist, puts it, mental aberrations may cause the subject to become involved in episodes which propel toward criminal behavior. Certain mental conditions seem to predispose the subject to violent reactions, whereas states due to senile deterioration are more often associated with disorderly conduct or vagrancy. This is illustrated by a table prepared some years ago by the New York State Hospital Commission, showing distribution of crimes among clinical diagnoses of 646 persons admitted to Matteawan Hospital, New York, an institution for the criminally insane.[44] The table follows:

PER CENT DISTRIBUTION OF CRIMES AMONG CLINICAL GROUPS

Crime	Per Cent of Total Crimes						
	Senile	General Paralysis	Alcoholic	Manic-depressive	Dementia Praecox	With Constitutional Psychopathic Inferiority	With Mental Deficiency
Homicide (all forms)	—	2.9	17.6	2.9	32.4	14.7	17.6
Assault (all forms)	—	3.8	24.1	7.6	25.3	17.7	6.3
Burglary	—	13.2	—	7.9	39.5	23.7	5.3
Larcency (all forms)	1.3	22.8	5.1	6.3	24.1	15.2	7.6
Public intoxication	2.9	2.9	70.6	—	5.9	5.9	—
Disorderly conduct	2.4	13.4	17.1	12.2	17.1	17.1	7.3
Vagrancy or prostitution	8.5	15.4	13.8	4.3	35.1	6.9	7.4
All crimes	3.6	11.5	16.9	7.3	25.5	14.7	7.4

That mental defect usually is only one of several multiple causes of crime is suggested by a rather neat comparison. Various studies show that mental defect has some relation to the etiology of major crimes of violence in a substantial percentage of cases.[45] Studies of the inmates of mental institutions, on the other hand, show a markedly lower incidence of such behavior.[46]

holic impulse with amnesia (141); 2. Alcoholic impulse—memory retained (171); 3. Post-alcoholic depression (31); 4. Out of work (112); 5. Destitution (64); 6. Domestic trouble (120); 7. Ulterior purpose (61); 8. Fear of imprisonment or on arrest (41); 9. Business worries (27); 10. Depression from various causes (20); 11. Other causes (shame, mistake under alcohol) (7); 12. Weak-mindedness (46); 13. Neurasthenia (8); 14. Epilepsy (10); 15. Morbid mental states (18); 16. Insanity (123).

East, Medical Aspects of Crime (1936), Ch. V, p. 141.

[44] The table is reproduced from Nolan, Some Characteristics of the Criminal Insane, (May 1920) 5 The State Hospital Quarterly 362. It covers 646 patients, a rather small series, and the table is reprinted to show efforts at correlation of mental defect with type of crime, not as proof of exact relationships.

[45] Dr. A. Warren Stearns, during his tenure as psychiatrist of Massachusetts State Prison, made an intensive study of 100 prisoners, 58 of whom had been convicted of manslaughter, 39 of second degree murder and 3 of first degree murder. He found that 20 per cent were drunk when the crime was committed, and that "twenty of the series showed well marked departure from normal mental condition, nine being definitely insane, three feeble-minded, eight presenting personality disorders of so gross a character as to limit their responsibility." Stearns, Homicide in Massachusetts, Am. Jr. Psychiat., 1925, iv, 725.

See also, *Stearns, Medical and Social Factors in Crime, ANN. INT. MED., 1943, xviii, 599.

[46] Elwell found that very few homicides were committed in the asylums of Ohio, or of other states, and drew the conclusion that not one out of a thousand of those who commit murder are actually insane, but become conveniently afflicted with mental disorder for purposes of trial. Elwell, Epilepsy as a Defense for Crime, (1890) 8 Medico-Legal J. 55. It is

Part of this difference is due to repression, segregation, careful guarding by hospital personnel, but much of it seems fairly attributable to the fact that the inmate is now unable to become involved in those social transactions which give rise to the multiple stimuli that propel toward criminal behavior. Protect the lower fraction of the social structure from the fierce pressure of a competitive system, alleviate the distorting and disturbing tensions which the less than average person feels, treat criminality by curing widespread maladjustments, and it is reasonable to believe that you will see a sharp fall in crime and in admissions to mental institutions. Deterioration of the inadequate personality is partially a symptom of a social organization not fully adapted to protecting its weaker members.

On the horizons of medical criminology, we can see an approaching emphasis on functional studies. In 1929 Berger published his first paper describing the action currents or "brain waves" given off continuously by the cerebral tissue.[47] The electro-encephalogram is a graphic tracing of these waves which can be made by a competent laboratory technician, without risk of injury to the patient. This is done by properly applying electrodes to various locations on the patient's cranium, and taking off the action currents for automatic tracing onto a moving tape by a relatively simple recording device.

Dr. William Lennox and Dr. F. A. Gibbs and his wife, all of Boston, among other leading workers, have been amassing great numbers of normal and abnormal tracings for some years to the end of developing criteria of interpretation. Abnormal waves emanating from a particular region of the brain help localize a suspected brain tumor. The workers mentioned postulate that epilepsy, one of our most enigmatic diseases, must be considered to be a cerebral dysrhythmia with characteristic "brain wave" patterns. The implications for Scientific Proof, present and future, of this line of research should be clear.

For instance, we have long known medically that some persons afflicted with epilepsy may commit violent crimes during phases of the disease which momentarily destroy their mental responsibility. The epileptic may commit such a crime during a disoriented state of "epileptic furore" or frenzy; he may commit it during the post-seizure "clouded" state when his sensorium is radically deranged but he is nevertheless able to walk and perform actions as in a dream. Again, in lieu of his usual convulsion or lapse of consciousness, the epileptic may have a substituted attack called a "psychic equivalent," during which he is temporarily disoriented but may appear outwardly normal except for a glassy stare, a certain incoherence of speech and slightly incongruous conduct. While in the grip of one of these states, the epileptic

interesting to note that Dr. Walter Channing, responding to the author's questionnaire, took sharp issue with this opinion and cited experience of the New York courts in support of his contrary belief that an appreciable percentage of homicides are committed by insane persons. Id. at 61.

[47] Berger, H.: Ueber das Elektroenkephalogramm das Menschen, Arch. f. Psychiat., 1929, lxxxvii, 527.

is subject to so-called automatism, and may perform involved acts and fairly complex crimes without insight or power to abstain. We do not understand all the mental phenomena involved here, but we can say if the case is genuine that the unfortunate perpetrator of the homicide at the time of his conduct was both unable *to appreciate the nature and quality of his act* (the more basic test under McNaghten's rules) and *to distinguish right from wrong.*

In more than one celebrated murder prosecution both in England and in America the defense of epilepsy has been injected, which is formally raised under a plea of insanity.[48] Two important problems of Scientific Proof arise:

(1) Is the defendant a true epileptic or is the history of past "fits" fabricated, or if true, are the attacks described referable to some other disease capable of producing occasional convulsions?

(2) Assuming defendant is a true epileptic, was his epilepsy so operative at the time of the alleged criminal act as to destroy mental responsibility? Since there are thought to be 600,000 epileptics in the United States alone, it is easy to see that an epileptic may commit a deliberate murder during a lucid interval between seizures and try to escape criminal penalties by falling back on a false plea that the conduct occurred during a period of "automatism."

The first problem can usually be solved by application of the electroencephalogram. He might have no spontaneous seizures during his surveillance in prison. But in the laboratory he can be asked to hyperventilate (prolonged rapid breathing) or innocuous materials can be given without

[48] *English cases: Rex v. James Hadfield,* 27 Howell's State Trials 1290 (1800). (Psychotic deterioration of epilepsy originally due to war head injury; not guilty by reason of insanity); *Rex v. Thomas Bowler,* Annual Register, 309 (1812) (convicted); *Rex v. John Boss,* 16 Cr. App. R. 71 (1921) (conviction affirmed); *Rex v. Fryer,* 24 Cox C. C. 403 (1915) (guilty but insane); *Rex v. Henry Perry,* 14 Cr. App. R. 48 (1919) (conviction affirmed; the epileptic state must have been operative at the time of the act in such way as to destroy mental responsibility); Berkeley-Hill and Owen, Post-Epileptic Automatism as a Defence in a Case of Murder, Jr. Royal Army Med. Corps, 1930, lv, 54 (acquitted).

American cases: Commonwealth v. Snyder, 224 Pa. 526, 73 Atl. 910 (1909) (conviction affirmed; mere fact that accused was an epileptic creates no presumption of insanity or mental irresponsibility); *People v. Barberi,* 47 N.Y.S. 168, 12 N.Y.Cr.R. 89, 423 (1896) (trial court charge: epilepsy must have been operative at time of act in such way as to destroy mental responsibility of defendant at time he acted); *People v. Magnus,* 155 N.Y.S. 1013, 92 Misc. Rep. 80, 34 N.Y.Cr.R. 1 (1915) (conviction reversed because undisputed medical testimony showed act was committed during epileptic seizure); *Oborn v. State,* 143 Wis. 249, 126 N.W. 737 (1910), 31 L.R.A.(N.S.) 966 (conviction affirmed: mere proof of epilepsy is not proof of insanity).

See, also: *Olden v. State,* 176 Ala. 6, 58 So. 307 (1912); *People v. Tucker,* 11 Cal.(2d) 271, 78 P.(2d) 1136 (1938); *Taylor v. United States,* 7 App. (D.C.) 27 (1895); *Quattlebaum v. State,* 119 Ga. 433, 46 S.E. 677 (1904); *State v. Wright,* 112 Iowa 436, 84 N.W. 541 (1900); *Roop v. Commonwealth,* 201 Ky. 828, 258 S.W. 667 (1924); *State v. Klinger,* 46 Mo. 224 (1870), appeal dism'd, 13 Wall. 257, 20 L.Ed. 635 (1871); *State v. Hayes,* 16 Mo.App. 560 (1885); *State v. Pennington,* 146 Mo. 27, 47 S.W. 799 (1898); *State v. Maioni,* 78 N.J. Law 339, 74 Atl. 526 (1909), 20 Ann.Cas. 204; *State v. Ehlers,* 98 N.J.Law 236, 119 Atl. 15 (1922), 25 A.L.R. 999; *People v. Furlong,* 187 N.Y. 198, 79 N.E. 978 (1907); *Coffey v. State,* 60 Tex.Cr.R. 73, 131 S.W. 216 (1910); *Zimmerman v. State,* 85 Tex.Cr.R. 630, 215 S.W. 101 (1919); *Batchan v. State,* 104 Tex.Cr.R. 398, 284 S.W. 549 (1926); *State v. Clark,* 156 Wash. 47, 286 Pac. 69 (1930).

risk of bodily injury (provocation tests) for the purpose of making the latent epilepsy patent, so that diagnostic tracings of the peculiar brain waves may be recorded by the electro-encephalogram. (See accompanying illustration.)

The second question cannot be answered conclusively in this way, even though the presence of true epilepsy be so established. This is because epi-

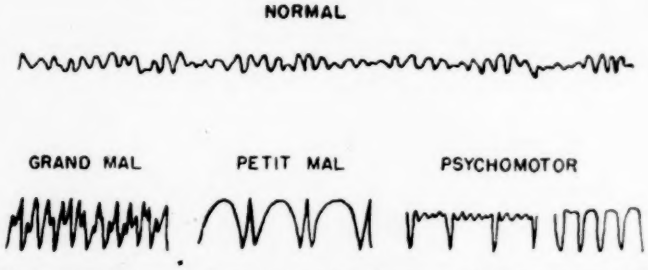

FIG. 1. These E.E.G. tracings, made in the laboratory of Lennox and Gibbs, show the types of cerebral dysrhythmia found in three types of epileptic seizures. The upper line shows the brain wave pattern of a normal person, the waves occurring at the rate of 8 or 10 a second. During a grand mal seizure (convulsive or so-called Jacksonian type), the brain waves become fast and spiky. During a petit mal seizure (transient loss of consciousness without generalized convulsions), the brain waves exhibit a wave and spike pattern. (Lower middle.) During a psychic variant (psychomotor) seizure, the E.E.G. tracing shows slow waves. (Lower right.)

leptics are orientated and mentally responsible in the interim periods and seizures may be separated by long intervals.[49]

It is characteristic of genuine "epileptic" crimes during states of automatism that the actor has an amnesia, or loss of memory, for most or all of the transaction. One must investigate every circumstance of the crime and weigh every shred of evidence. Usually such crimes are violent or brutal, sometimes they are spontaneous, but craftiness may be used. Often the act is committed without plausible motive, often against a loved one rather than an enemy, and there is lack of caution as to the time, place or means taken to avoid detection. Some of these indicia of a genuine epileptic crime may be missing. If one can show that the amnesia (i.e., apparent loss of memory) is simulated, not genuine, this is persuasive evidence that the defendant's whole version of "automatic conduct" is sheer fabrication.[50]

[49] The reader must not assume that all epileptics are likely to commit crimes. The writer doubts the authenticity of the "epileptic mechanism" in many cases from medical literature. Dr. H. Houston Merritt, with whom the author has been surveying medico-legal aspects of epilepsy, has followed thousands of epileptics in the clinic and believes that criminal conduct among these persons is a rare phenomenon.

This is the belief, also, of Dr. Winfred Overholser, well-known forensic psychiatrist. (Personal communication.)

Dr. A. Warren Stearns, one of our widely experienced forensic experts, has come to the conclusion that most alleged epileptic "amnesia" is simulated. (Personal communication.)

It is interesting to note that Ernst in studying etiology of crime in violent criminals concluded that epilepsy was an infrequent factor. Ernst, Ueber Gewalttätigkeitsverbrecher und Ihre Nachkommen (Violent Criminals and Their Offspring) (1938).

[50] *Lennox, Amnesia, Real and Feigned, Am. Jr. Psychiat., 1943, ixc, 20. U. Chi. L. Rev. (April 1943) —.

Recently the electro-encephalogram has been used in England in two murder trials involving the defense of epilepsy. The prisoner had not experienced convulsive seizures in prison while under surveillance. The electro-encephalogram, however, proved conclusively that he had the disease, and this corroborative evidence, coupled with other proof, caused the jury to return a verdict of "guilty, but insane." [51]

We may expect to see the electro-encephalogram (E.E.G.) used increasingly in murder trials in an effort to buttress a plea of insanity by showing the prisoner has grossly abnormal brain waves. Courts must be careful not to permit extravagant claims founded upon uncritical interpretation, for cerebral dysrhythmia is a symptom, and medical science is not yet ready to say what every given tracing implies.[52]

There are other developments in prospect in the field of Medical Criminology. The American Prison Association is working toward adoption of uniform classifications in studying mental defects of prisoners and the diseases they may show.[53] More adequate methodology will be devised, and with the eventual advent of centralized statistics, comparative data on the relationship of disease to crime will be available. More voluminous court statistics and special studies by competent medical men or social workers will narrow the gap of inference by providing trustworthy reconstructions of the causes of the particular crime, after the fashion of East's able example. The surge may move forward to the realization of a profession of medical penology with the opportunities and compensation desirable to attract the ablest men.[54] In that day we shall see more careful thought given to segregation of prisoners according to behavior patterns, and their likely interactions, and we shall see the device of parole used more effectually. We shall see, too, far more attention given to early discovery of pre-delinquency and of potentially dangerous psychopathic personalities so that proper mechanisms for preventing crime can be put into operation.[55]

Medicine made a weighty contribution to the study of human behavior by giving investigators the "case method." [56] There is reason to feel that the medical man will continue his substantial part in the study of the thorny practical problems of criminology and sociology.

II. Forensic Pathology and Some of Its Outstanding Problems

This second great species of Scientific Proof makes use of the fact that most diseases, injuries, and irritants produce characteristic changes in the

[51] Middle Templar, From an English Office Window, (Nov. 1942) 20 Can. B. Rev. 794, 798.

[52] Lennox and Gibbs propose to study amnesic cases and other select groups in prison populations with the E.E.G. to see what may be discovered regarding abnormal brain waves. (Personal communication.)

[53] Personal communication.

[54] Roche, The Pennsylvania Plan (Intramural Training in Penal-Psychiatry) (1939), Proc. Am. Prison Ass'n, 315.

[55] See Thom, *supra*, note 37.

[56] Dr. William Healy is generally credited with bringing the individual case method into prominence in the study of crime.

tissues of the organs or structures affected. This diagnostic change may be discovered by gross inspection at times, or it may call for preparation of tissue sections, embedded in paraffin blocks, cut into thin slices by a microtome, mounted on slides and so stained as to bring out architectural patterns for study under the microscope. Pathology, or the morphology of body tissues changed by disease, injury, or irritation, has long been a foundation subject of the medical curriculum. The forensic pathologist, ideally, is a medical man who has specialized in Pathology in hospital practice until he is able to diagnose apparent cause of death due to disease. He then has acquired knowledge of those many special technics which enable a proper expert to estimate the time of death, to infer the type of weapon used, to distinguish suicide from homicide, in short, to aid the administration of criminal justice by an expert opinion regarding "how, when and by what means the decedent came to his death or injury." [57]

Most of these studies presuppose a postmortem examination of a dead body. Actually the contribution of forensic pathology includes a wide range of clinical and laboratory tests. Properly drawn laws would call this science into broader play in non-fatal injuries or accidents.

Who, for instance, is apt to have a more reliable grasp of the relationship of trauma to disease than the pathologist? [58] In many medico-legal cases in which the nature of a disease is in doubt, we turn to the pathologist to find the answer by studying a lymph node or other bit of tissue invaded by the disease. This diagnostic specimen is obtained by the virtually riskless expedient of removing a sample of test material from the patient by the minor procedure known as "biopsy." The probative value of such evidence is so high that in all those usual cases in which the surgical risk is trivial, persons who claim to suffer from cancer as a result of injury probably should be required to submit to diagnostic biopsy as a reasonable requirement of proving the disease.

Forensic pathology, as a science, is capable of making at least three, and perhaps more, significant contributions to the problem of proof:

(1) Identification: of persons.

(2) Identification: of cause and time of death, or of a non-fatal injury.

(3) Causation: pathogenesis of the abnormal bodily state or the disease in litigation, including possibility that a given injury caused the terminal condition for which compensation is sought.

Example: Identification of persons: Mr. X, a wealthy 68 year old man, suddenly disappeared. Problems involving inheritance of property made it material to determine whether his body was that all but destroyed in a fire which also took the life of one John Doe. Analysis of blood from the heart showed that the individual had been drinking alcohol. Advanced arteriosclerosis showed he must have been an elderly

[57] The Medical Examiner's Office in New York City and the Department of Legal Medicine in the Harvard Medical School are equipped to give theoretical and applied training to select candidates in this important new profession.

[58] The pathologist is able by virtue of his training and the technics at his command, to study progressive tissue reactions which follow single or repeated traumatic stimuli.

person, as did senile bony changes in the vertebrae and pronounced enlargement of the lateral lobes of the prostate. There was pronounced spondylitis deformans with moderate kyphosis of the upper thoracic spine. There were evidences of an old vascular accident to be seen near the internal capsule in the right lenticulostriate nucleus of the brain. Investigation showed that X suffered from curvature of the spine, had difficulty in passing his urine, a trouble compatible with prostatic obstruction, that three years previously a "stroke" had partially paralyzed his left side, and that he was often given to drinking alcoholic beverages with John Doe. This evidence, coupled with a few other circumstances, was sufficient to satisfy all interested persons that the charred remains were those of Mr. X.[59]

At the moment forensic pathology is highly developed in some quarters as a scientific pursuit, but its proper application is crippled by the fact that its legal utilization is through the antiquated coroner's office. In seven of our American jurisdictions modern medical examiner systems have been established by law.[60] These are not identical, but under the ideal mechanism, approached in New York City, the forensic pathologist gains paramount right of investigation in a broad category of cases in which death has resulted from accident, casualty, or under unusual or suspicious circumstances. He is able to move forward with alacrity, to take charge of the body and the perishable evidence in the environment, and to give numberless scientific aids to investigating police officers.

In 41 American states and in England, the Coroner's office is still used to investigate such cases. In England since 1926 only medical men or lawyers are eligible to serve as Coroners. In the United States, this official is usually a layman, not infrequently simultaneously holding the office of justice of the peace. The lay Coroner cannot personally perform those scientific duties of investigation which his office requires, and decisive scientific evidence is often lost through delay or oversight. The status of the Coroner, as a quasi-judicial officer, has been anomalous and abortive since the office was first conceived, perhaps as early as the time of King Alfred. The Coroner functions by holding an inquest, and usually must impanel a jury. The verdict of the Coroner or of his jury is of no real legal consequence, for it cannot be offered in evidence in a subsequent prosecution for homicide [61] or in an independent civil action brought on an insurance policy, where "suicide or natural death" might be a controlling issue.[62] Even Shakespeare made caustic reference to "Crowner's Quest Law." [63]

[59] Case of Dr. Alan Richards Moritz, Professor of Legal Medicine, Harvard Medical School.

Following the tragic Cocoanut Grove fire in Boston (Nov. 1942) medical examiners were confronted with the task of identifying scores of charred bodies. Their ability to do this within a very brief period of time was an amazing feat. Certain women burned beyond recognition were successfully identified by the length of time they had been pregnant.

[60] Massachusetts; New York City; Newark, New Jersey; Maine, Maryland; Connecticut; Rhode Island.

[61] *Blackwell v. State*, 166 Miss. 524, 146 So. 628 (1933); *Hall v. State*, 137 Ala. 44, 34 So. 680 (1903); *State v. McCausland*, 82 W.Va. 525, 96 S.E. 938 (1918); *Hedger v. State*, 144 Wis. 279, 128 N.W. 80 (1910).

[62] *Boehme v. Sovereign Camp, W.O.W.*, 98 Tex. 376, 84 S.W. 422 (1905).

[63] Hamlet, Act V, Scene 1, the grave-diggers scene.

It is surprising that we have not brought the important science of Forensic Pathology into more extensive use, for many vital civil and criminal law questions turn upon the fact and circumstances of death, and historically investigation of death was one of the first law-medicine coöperations to be accented.[64]

Without much more ignominious delay, doctors and lawyers must push forward to an ideal "medical examiner act" in each state. Today the Coroner's jurisdiction is narrow and perilous, for if he orders a post-mortem examination in any case except where he has reasonable grounds to suspect

[64] The Egyptians required physical examination of a woman for pregnancy before she was punished by whipping.

In *Ariston v. Conon,* an action for assault and battery in Greek law, the plaintiff, who had been badly beaten by defendant, offered testimony of a surgeon to support his claim that "if a sudden discharge of blood had not relieved me at the moment of intense suffering and danger, I should have died of suppuration." The Orations of Demosthenes. The Oration against Conon, Demosthenes, Vol. 5, 169 (tr. by Kennedy, 1881).

The Romans exhibited the bodies of slain persons in the market place for the populace to view. They also relied upon non-combustibility of the heart to prove death by poisoning.

The "Mirror of Justice," Book 1, c. 3 (Selden Society Publication), a source of doubtful authority, refers the institution of the coroner's office to the time of King Alfred.

In the Saga of Njal (an Icelandic saga of events occurring toward the end of the 1100s), we read: "I summon these nine neighbors who dwell nearest the spot to ride to the Althing, and to sit on an inquest to find whether Flosi, Thord's son, wounded Helgi, Njal's son, with a brain, or body, or marrow wound, which proved a death wound, and from which Helgi got his death. . . ." Dasent, The Njals Saga (Edinburgh) (1861).

The "Hsi Yuan Lu" or "Instructions to Coroners," written during the reign Shun Yu (A.D. 1241–1253), and modified from one generation to another, is still used by Chinese officials in the investigation of sudden death. This curiosa, notable for its shrewd suggestions, has now been translated into English. See MacAlister, (1924) 17 Proceedings of the Royal Society of Medicine, History of Medicine Section.

Just prior to 1300 A.D., the law school at Bologna prevailed upon doctors to open dead bodies in order to determine the cause of death in medico-legal cases. This proved so useful an adjunct to administration of law that the practice of forensic pathology became fairly prevalent. It was then seen that the methods developed could be applied extensively to the independent study of disease and causation of death in cases which had no medico-legal import. Thus the law was the father of forensic pathology and the grandfather of orthodox pathology.

The Borgia family (1476–1519) and the De Medici's (1389–1589) made it a custom to have their physicians examine friends who had died, to make sure that they had not been poisoned.

The "Bamberger Halsgerichtsordnung" (Bambergensis), composed by Johann von Schwartzenberg and enacted by Bishop Georg, in Germany, in 1507, was primarily a statute dealing with criminal procedure. It is interesting to us because it gave physicians and surgeons important functions in the investigation of sudden death, including suspected infanticide, and was the pattern for the more ambitious "Caroli constitutio criminalis" or Carolinian code of Charles V, promulgated in 1532.

See Ludovic, Constt. Crim. Car. V, Halle (1716), which gives comparative provisions of the Bambergensis and Carolinian codes. See, also, Von Bar, History of Continental Criminal Law (1916), p. 208.

For a translation with comments, see *Polsky and Beresford, Some Probative Aspects of the Early Germanic Codes, Carolina and Bambergensis, Ann. Int. Med. (May 1943), xviii, 23 B. U. L. Rev. (April 1943) —.

For the history of Forensic Pathology and Institutes of Legal Medicine on the continent, see The Rockefeller Foundation, Methods and Problems of Medical Education (9th Ser.), Institutes of Legal Medicine (1928).

For papers in this series on Forensic Pathology, see:

*Jetter, Pathological Diagnoses of Causes of Death in an Unselected Series of Acute and Chronic Alcoholics, Ann. Int. Med., 1943, xviii, —, — Rocky Mt. L. Rev. —.

*Leary, How a Modern Medical Examiner's Office Functions in a Typical Investigation of "Sudden Death": Points of Superiority Over Coroner's Office, Ann. Int. Med., 1943, xviii, —.

death by criminal violence, he is liable in damages to the next of kin for wrongful autopsy.[65] Tomorrow, the medical examiner will be given a broad discretion as to those fatal or non-fatal cases which he might investigate in aid of criminal or civil litigation. Already many of our Workmen's Compensation Acts empower Commissioners to order autopsies where the cause of death is obscure and further light is needed to determine compensability of an alleged injury. Courts of those states which refuse a defendant, in personal injury litigation, the right to have the plaintiff examined by an impartial physician appointed by the judge, nevertheless recognize the right of the court, without any empowering statute, to order an exhumation and autopsy of a dead person to provide desirable evidence in a trial for murder.[66]

An efficiently operated medical examiner system need not cost substantially more than the coroner's office. Probably the desirable goal is a compact organization of forensic pathologists, financed as a state agency, with stations in a few metropolitan centers, so that the staff could serve as consultants in obscure cases. Ordinary cases of sudden death could be passed upon by local physicians. Such a medical examiner's office could maintain a functional coöperation with a state Scientific Crime Detection Laboratory, as both agencies are auxiliary aids to police and law enforcement agencies.

III. Scientific Crime Detection

Scientific Proof has manifold applications in detecting criminals and reconstructing essential evidence of the corpus delicti or body of the crime. The reader is saved from surfeit by limitations of space, but perhaps I can cajole the intellectually curious to scan a few select items, presented in chronological form, to show how broad and deep are the implications of scientific crime detection.

1. 2030 B.C.: *Trial by ordeal:* The Code of Hammurabi[67] mentioned ordeals, and the ordeals of fire, water and the like were widely practiced to determine guilt or innocence. They were not abolished in England until 1213.[68] Now recognized as superstition, at the time of their use they were regarded as objective scientific corroboration. They reflect the constant questing for proof by external tests.

   In primitive India, the Hindu priests required one suspected of crime to chew *dry* rice for a given time and then to eject the *bolus* upon a piece of dry bark. If the rice was still dry, the suspect was guilty. This had a pseudoscientific rationale; it was believed that fear of detection and punishment would inhibit the nervous mechanism of the salivary gland and prevent the flow of saliva.[69]

[65] *Aetna Casualty and Surety Co. et al v. Love,* 132 Tex. 280, 121 S.W.(2d) 986 (1938): Liable for ordering post-mortem examination to determine cause of obscure death in aid of workmen's compensation insurance investigation. *Gurganious v. Simpson,* 213 N.C. 613, 197 S.E. 163 (1938): Liable for autopsy on boy drowned in Y. M. C. A. pool, there being no suspicion of foul play.

[66] *Gray v. State,* 55 Tex.Cr.R. 90, 114 S.W. 635 (1908).

[67] Thatcher, The Library of Original Sources, Vol. I, p. 439.

[68] See Watt, The Law's Lumber Room, (2d ed.) London (1898); Lea, Superstition and Force, (4th ed.) Phila. (1892).

[69] Glaister, The History of Medical Jurisprudence and Criminal Procedure in Primitive and Mediaeval Times (May 1897), The Medical Times and Hospital Gazette.

2. c. 1,000 B.C.: *Proof of perjury and paternity by forensic psychology:* The Judgment of Solomon as to which of two female claimants was the true mother of the child in question was based on their psychological reactions to the proposal that the child be divided in two.[70]
3. 600 B.C.–500 A.D.: (*The Talmud*): *Scientific disproof of adultery:* A husband, desiring to divorce his wife, contrived to get her and other guests drunk at a party, carried her and a male guest to a couch, and threw egg albumen between them. He then called neighbors to bear witness to adultery. The resourceful wife, on becoming sober, summoned her physician, who identified the substance as egg white, not seminal fluid. We are not told what means he used. (Today, we would use specific chemical tests such as the Florence test,[71] or the microscope, or immunological methods.)
4. 287–212 B.C.: *Proof of adulteration of metal:* Legend has it that Archimedes, the Greek physicist and mathematician, used scientific proof to settle an issue involving possible adulteration of metal and obtaining of money under false pretenses. Heiron called upon Archimedes to say whether the suspected smith had used silver alloy in a gold crown. While taking a bath, Archimedes conceived the idea of immersing the crown in water to see how much liquid it displaced as compared with true gold. With real scientific independence and ardor, he sprang from the bath, and ran naked through the street to his home shouting "Eureka!" [72]
5. 15 B.C.–19 A.D.: *Forensic chemistry: toxicology: non-combustibility of the heart as proof of death by poisoning:* The ancients falsely believed that non-combus ibility of the heart was proof of poisoning. This assumption was challenged by defense counsel in the trial of Plandina, wife of Piso, for the murder of Germanicus. The defense admitted that the heart of Germanicus was non-combustible, but claimed this was due to heart disease. Collateral evidence leads us to believe that Germanicus probably did die of natural causes.[73]
6. c. 1591: *Forensic microscopy:* Hans and Zacharias Jansen invented the microscope.[74] But we may point out that the history of lenses runs back to the Egyp-

[70] First Kings, III, 16.

[71] Florence, 10 Arch. d'Anthrop. Crim. 417 (1896). The alleged seminal stain is put into solution; a drop is placed on a glass slide and allowed to nearly dry; a drop of Florence's solution (potassium iodide 1.5 grams, iodine 2.5 grams, and water 30 c.c.) is added, and the preparation is viewed at once under the microscope. If semen is present haemin-like crystals form, singly, in clusters and in rosettes and soon become unrecognizable. The test is not absolutely specific as the positive reaction is produced by action of iodine on choline, a natural base which occurs in many cells. It is most valuable as a negative test. Recently Pollak has canvassed all the useful methods of identification. Pollak, Semen and Seminal Stains, A Review of Methods Used in Medico-Legal Investigations, Arch. Path., 1943, xxxv, 140.

[72] Heath, Archimedes, London (1920).

[73] Comments of the ancient writers on this case are interesting:

Suetonius, Twelve Caesars, Caligula, 1: "[Germanicus] died of a lingering disorder not without suspicion of being poisoned; for besides the livid spots which appeared all over his body, foam poured from his mouth, and also his heart was found uncharred amongst the bones: its nature being such, as it is supposed, that when tainted by poison, it is indestructible by fire."

Tacitus, Annales, Book 2, Sec. 73: "His body, before its commitment to the pile, was exhibited naked in the Forum of Antioch, the place fixed upon for the sepulchral rites: whether it bore the marks of poison remained undecided; for people were divided in their conclusions according as they pitied Germanicus and presumed the guilt of Piso, or were prejudiced in his favor."

Pliny, Natural History, XI, 37, Sec. 71: "It is denied that one can cremate those who have died of a cardiac illness, and those who have taken poison. There surely survives an oration of Vitellius in which he charges Gnaeus Piso with this crime on this ground: that it had been witnessed that the heart of Germanicus Caesar could not be cremated because of poison. Piso was defended as to the nature of the illness.

[74] Clay and Court, The History of the Microscope, London (1932).

tians, and that Leonard Digges, c. 1550, had employed a telescope to view far-off objects.[75]

7. 1727: *Forensic photography:* Johann Heinrich Schulze (1687–1744), a physician of Halle, placed objects in a glass containing a mixture of white chalk and nitrate of silver and by exposing them to light produced transient photographic images, the first ever achieved.[76]
8. 1800: *Forensic physics:* F. W. Herschel discovered infra-red rays.
9. 1804: *Forensic physics:* J. W. Ritter discovered ultra-violet light which is now used for preliminary identification of stains, for showing up obliterated writing in forgery, etc.[77]
10. 1829: Sir Robert Peel introduced the Act in Parliament which established a police system for London.
11. 1836: *Forensic chemistry: toxicology:* James Marsh (1794–1846), English chemist, described his famous "Marsh test" for identifying minute traces of arsenic, the basis for later, more refined tests.[78]
12. 1858: *Personal identification: fingerprints:* Sir William Herschel introduced fingerprinting as the official system of individual identification in India.[79]
13. 1860: *Forensic physics: spectrographic analysis:* Kirchoff and Bunsen noted that when temperature of a gas is raised sufficiently it radiates light or energy of characteristic wave lengths dependent on the molecular structure of the gas tested and the method of excitation.[80] These line spectra enable identification of inorganic substances which can be vaporized. The heat required for vaporization usually destroys organic substances.
14. 1879: *Personal identification:* The Bertillon Cabinet was founded in Paris. The anthropological identification method of Alphonse Bertillon (1853–1914) was

[75] Digges, T., Pantometria (1571), p. 5 of preface, says of his father, Leonard Digges:

"My father, by his continual paynfull practices assisted with demonstrations mathematicall, was able, and sundrie times hath, by proportionall glasses, duely situate in convenient angles, not onely discovered things farre off, read letters, numbred peeces of money with the very coyne and superscription thereof, cast by some of his freends of purpose uppon Downes in the open fieldes, but also seven myles off declared what hath been doon at that instante in private places."

[76] Stenger, The History of Photography, Easton, Pa. (1939). First permanent photograph: J. Nicéphore Niepce (1822); Daguerrotype perfected: Daguerre and Niepce (1839). For Forensic Photography, see Scott, Photographic Evidence, Kansas City (1942).

[77] Nicholson's Journal (1804), 214. See Ellis and Wells, The Chemical Action of Ultra-violet Rays (Revised by Heyroth), N. Y. (1941); also, Radley and Grant, Fluorescence Analysis in Ultra-violet Light (2d ed.) London (1935); also, Rorimer, Ultra-violet Rays and Their Use in the Examination of Works of Art, N. Y. (1931).

Wheatstone in 1835 was probably the first to observe that a brilliant light (ultra-violet light) is emitted when mercury is vaporized in an electric arc. Perkin, (1911) 6 Trans. Faraday Soc. 199.

[78] Edinburgh Philosophical Journal (Oct. 1836).

See *Wigmore, Circumstantial Evidence in Poison Cases, Clinics, 1943, ii, 1507, 23 B. U. L. Rev. (April 1943) —.

*Walker, Scientific Evidence in Poisoning Cases, Clinics, 1943 ii, 1520, 23 B. U. L. Rev. (April 1943) —.

*Thayer, Note on Poison in Roman Private Law, Clinics, 1943, ii, 1625, 23 B. U. L. Rev. (April 1943) —.

Mathieu Joseph Bonaventure Orfila (1787–1853), French toxicologist and chemist, born in Spain, is regarded as the father of scientific toxicology. He published his Traité des poisons, or Toxicologie generale, in 1813.

[79] Mitchell, The Scientific Detective and the Expert Witness, N. Y. (1931). For one of the best resumés of the scientific and legal history of fingerprints, see Hankison, Evidence of Finger-Prints, ch. 54 in Underhill's Criminal Evidence (4th ed. by Niblack), Indianapolis (1935).

[80] Pogg. Ann., (1860) 110, 160; (1861) 113, 337. See Wilson, Spectrographic Analysis as an Aid in Identification Problems, (1934) 25 J. Crim. L. and Crim. 160.

officially adopted in France in 1888 as a means of identifying criminals, but it was later abandoned with advent of finger-printing.[81]

15. 1893: *Scientific crime investigation:* Hans Gross, sometimes called "the father of scientific criminology," brought out his classic treatise.[82]
16. 1895: *Forensic physics: Roentgen-ray:* Professor Wilhelm Konrad Röntgen of Würzburg, Bavaria, discovered that when cathode rays encounter matter, they give off secondary rays which carry no charge but penetrate ordinary solids.[83]
17. 1898: *Forensic anthropology: Pearson's formula:* Karl Pearson, on June 16, 1898, in a paper read before the Royal Society, announced his formula for reconstructing the stature of a corpse or living person from such bones as the femur, humerus, radius and tibia.[84]
18. 1900: *Forensic immunology: identification by human blood groups:* Landsteiner made the first observations regarding differences between bloods of normal human beings.[85] This ushered in the important blood grouping determinations, primarily useful as evidence of non-paternity.[86]
19. 1901: *Forensic immunology and biochemistry: the precipitin test:* Uhlenhuth showed that due to protein specificity, an unknown blood can be identified as of human or animal origin by utilizing principles of immunology described by Bordet in 1898. (The source of any minute amount of protein may be identified in the same way.) Uhlenhuth was the first worker to publish results of tests demonstrating practical application of the precipitin reaction to medico-legal work. Having injected rabbits with human blood he used the antiserum so produced in tests against 19 different bloods and found that a positive precipitin reaction occurred only with human blood. He also used the method to identify human blood on test objects such as a stick, sand, cotton trousers, a hatchet, and several stained articles.[87]
20. 1912: *Forensic physics: Fire-arms identification:* Balthazard photographed bullets and from the photographic enlargements identified the precise weapons from

[81] For a full description of the Bertillon method, see Bertillon, Identification of the Living (tr. by Webster) in 1 Peterson, Haines and Webster, Legal Medicine and Toxicology, (2d ed. 1923) Phila.

[82] Gross, Handbuch für Untersuchungsrichter, als System der Kriminalistik (2 vols. 1893), translated into eight foreign languages; in English under the title, Criminal Investigation, a Practical Textbook for Magistrates, Police Officers and Lawyers (by John Adam and J. Collyer Adam; 3d ed. by Norman Kendal, London, 1934).

[83] 6 L'Éclair Elect. 241 (1896). Röntgen's three memoirs are translated in The Electrician (Jan. 24, 1896, and April 24, 1897). Roentgen-ray evidence, because of its direct visual quality, was speedily admitted by the courts. (*Smith v. Grant* (1896), 29 Chicago Legal News 145.)

[84] Pearson, On the Reconstruction of the Stature of Prehistoric Races, (1898) 192 Philosophical Trans. of the Royal Society, Ser. A, 169. His calculations were based in part upon the measurements of Rollet at Lyon in 1889.

See *Hooton, Medico-Legal Aspects of Anthropology, Clinics, 1943, ii, 1612, 15 Rocky Mt. L. Rev. (April 1943) —.

[85] Landsteiner, K.: Zentralbl. f. Bakt., Parasitenk. u. Infectionskrankh., 1900, xxvii, 357.

[86] See *Boyd, Protecting the Evidentiary Value of Blood Group Determinations, Clinics, 1943, ii, 1536, 17 So. Cal. L. Rev. (March 1943) —.

*Maguire, A Survey of Blood Group Decisions and Legislation in the American Law of Evidence, Clinics, 1943, ii, 1560, 17 So. Cal. L. Rev. (March 1943) —.

*Schoch, Determination of Paternity by Blood Grouping Tests: The European Experience, Clinics, 1943, ii, —, 17 So. Cal. L. Rev. (March 1943) —.

[87] Uhlenhuth: Deutsch. med. Wchnschr., 1901, xxvii. For practical details of this test, see Smith, S., and Glaister, J., Recent Advances in Forensic Medicine, Phila. (1931), 99.

The precipitin test was first used in a murder trial in 1902 in France, to prove that stains on the prisoner's clothes were human blood and not rabbit's blood, as he claimed. It was first used in an English court in 1910 in the murder trial of Marke Wilde. Dr. Willcox testified that old stains on the blue serge coat of the prisoner gave a positive precipitin test for human blood.

which they had been fired. He did this by comparing the markings made on bullets with those on other test bullets fired from the suspected weapons.[88]

21. 1912–1930: *Identification of instruments by markings:* Luke S. May carried on extensive studies devoted to identification of knives, tools and instruments by photomicrographs of scratches and marks made in their use.[89]

22. 1921: *Lie detector:* Larson began work on deception tests. He constructed a portable "polygraph" for recording relative changes in pulse, blood pressure and respiration. The so-called guilt reaction, due to anxiety, produces physiological changes in these values. Larson also developed an improved technic of questioning the suspect.[90]

23. 1923: *Identification: preserving imprints by moulage methods:* Hans Müllner of Graz reported his quick method of making casts of impressions left in soft materials.[91]

24. 1925: *Ballistics: comparison microscope:* The comparison microscope was devised by Gravelle of South Orange, N. J., at the instance of Calvin Goddard and was put to use in the Chicago Scientific Crime Detection Laboratory established in 1929.[92] It enables convenient microscopic comparison of two objects, such as markings on the death bullet and those on a test bullet fired from the gun which the prosecution alleges to have been the weapon used.

25. 1929: *Analysis of dust traces:* Considerable credit should be given to Edmund Locard, able director of the Laboratory of Police Technique of Lyon, France, for his valuable and refined work on this subject. Dust analysis had been faintly alluded to by old writers on legal medicine, and was actually applied by Hans Gross, but it was most stressed by Conan Doyle as a favorite method of his detective, Sherlock Holmes in such stories as "A Study in Scarlet," "The Five Orange Pips," and "The Sign of the Four." Locard attributes his original interest in the subject to reading the exploits of Sherlock Holmes.[93]

26. 1932: The Federal Bureau of Investigation (U. S. Department of Justice) established its Scientific Crime Detection Laboratory.

27. 1932: *Blood alcohol level as evidence of intoxication:* Widmark in Sweden showed by experimental work that blood alcohol determinations are valuable indices of intoxication.[94] This work led to adoption in Sweden of compulsory blood tests in criminal cases and traffic accidents. Traffic officers are equipped to take blood samples and these are sent to the State University of Lund for analysis.

[88] Goddard, Arms Identification: Its Story, (Nov. 1935) 10 Police "13–13" 10.

[89] May, Identification of Knives, Tools and Instruments a Positive Science, (1930) 1 Am. J. Police Science 246. Metallographic analysis was approved in *Magnuson v. State*, 187 Wis. 122, 203 N.W. 749 (1925), one of the most remarkable cases of scientific crime detection to be found in the law reports.

[90] Trovillo, A History of Lie Detection, (1939) 29 J. Crim. L. and Crim. 848. See, also, Larson, Lying and Its Detection, Chicago (1932); Inbau, Lie Detection and Criminal Interrogation, Balt. (1942).

For applied use in State Police work, see *Snyder, Criminal Interrogation with the Lie Detector (Eight Years' Experience by the Michigan State Police), Ann. Int. Med., 1943, xviii, 551, 15 Rocky Mt. L. Rev. (April 1943) —.

[91] Müllner, 4 Kriminalistische Monatshefte, (No. 12) 1930. Transl. 23 J. Crim. L. & Crim. (1932–3) 351.

[92] Goddard, Crime Detection Laboratories in Europe, (1930) 1 Am. J. Police Science 13, at page 21.

[93] (1929) 4–5 Revue Internationale de Criminalistique, 176–249. Transl. (1930) 1 Am. J. Police Science 276, 401, 496.

[94] See Widmark, Die theoretischen Grundlagen und die praktische Verwendbarkeit der gerichtlich-medizinischen Alkoholbestimmung, Berlin, Urban & Schwarzenberg, 1932.

For practical aspects, see *Ladd and Gibson, Legal-Medical Aspects of Blood Tests to Determine Intoxication, Ann. Int. Med., 1943, xviii, 564, 29 Va. L. Rev. (April 1943) —.

It is possible by scientific means to determine from a shattered window pane whether it was broken from the outside or from within the house [95]; to analyze minute traces of soil found on the suspects' shoes [96]; to gain signal help from microscopic preparations of a single hair [97]; to draw valuable inferences from tire and skid marks [98]; to reach a conclusion as to whether a gun-shot wound was inflicted by a weapon fired at a distance or by a gun held pressed against the victim's body.[99]

As the reader may have noticed, this species of Scientific Proof has certain special attributes:

(1) Convergence of attention on problems of *identification;*
(2) Applied use of the principles of the physical sciences;
(3) Reference of problems involving medical science to independent consultants;
(4) Chief connections with administration of criminal justice; main legal counterpart in the rules of evidence and the doctrines of criminal law which apply to investigation and trial of criminal charges.

Today the Scientific Crime Detection Laboratory of the F. B. I. is carrying on specialized investigations for many of the State Police Forces.[100] In time each State Police Force should have its own laboratory, and pains must be taken to make this work a career for the highly trained man, perhaps on some civil service basis. Many of the Scientific Crime Detection Laboratories now scattered throughout this country have limited value because of a tendency to draw personnel from the ranks of police officers on a seniority principle.

IV. Scientific Modes and Mechanisms of Proof

Under this head, we may study particular means of acquiring scientific evidence. We may study the critical limitations of such evidence producing

[95] Matwejeff, Criminal Investigation of Broken Glass, (1931) 2 Am. J. of Police Science 148. Tryhorn, The Examination of Glass, 12 Police J. (of England) No. 3 (1939); reprinted in (1939) 30 J. Crim. Law & Crim. 404.

[96] Johannsen, Manual of Petrographic Methods (1918).

[97] Glaister, Hair Considered Medico-Legally, (1927–8) 22 Trans. Medico-Legal Soc. 95; Kirk, Human Hair Studies. 1. General Considerations of Hair Individualization and Its Forensic Importance, (1940) 31 J. Crim. Law & Crim. 486. See, also, Smith and Glaister, Recent Advances in Forensic Medicine, Phila. (1931).

[98] Harper, A Graphical Method for Rapidly Determining Minimum Vehicle Speeds From Skid Marks, (1939) 30 J. Crim. Law and Crim. 96; Wiener, An Inaccuracy in the Determination of Vehicle Speeds, (1940) 31 J. Crim. Law and Crim. 249.

[99] Walker, Bullet Holes and Chemical Residues in Shooting Cases, (1940) 31 J. Crim. Law and Crim. 497.

For an interesting study in *Forensic Physics,* see Oldenburger, Human Trajectories, 13 J. Appl. Phys. 460 (July 1942). The author summarizes his results and paper as follows:

"It is proved that a human being M falling from a ledge A through the air to the ground below will attain the greatest range if M falls forward while standing upright. If M was found on the ground at a position B beyond this range of fall, M furnished energy himself to attain B. An analysis of trajectories from A to the ground, due to an effort on the part of M, is given. If the kinetic energy which M must produce to reach B is much greater than that which M can furnish after loss of balance, M made the trip from A to B by a premeditated jump. Such analyses are important for determining suicides."

[100] *Hoover, The Scientific Crime Detection Laboratory, Clinics, 1943, ii, 1503, 20 U. Chi. L. Rev. (April 1943) —.

agencies as the roentgen-ray,[101] the electro-cardiograph,[102] the electroencephalograph,[103] and the lie detector.[104]

We may study also the adequacy of existing modes of trial, and of social mechanisms needed to bring scientific evidence to the point of maximum legal utility. I have alluded to the need of taking scientific issues from lay jurors. Professor Edmund Morgan, Reporter of the American Law Institute "Committee on Evidence" charged with developing a new simplified Code of Evidence, has described certain immediate changes which proponents of Scientific Proof should help translate into legislation.[105] Professor Roscoe Pound, known everywhere for his school of sociological jurisprudence, believes that analysis has outrun social synthesis. He proposes a Ministry of Justice as a means of effecting rapid and successful transfusions of scientific thought into the circulating blood stream of law.[106]

In times past I have suggested the formation of a National Scientific Commission to serve as a master censor for the courts.[107] Such a body, made up of qualified legal and scientific persons, could probe into the merits of each species of scientific proof and lay down appropriate criteria, safeguards and cross-checks needed to make the evidence trustworthy. The several states could pass statutes providing that scientific evidence which conforms to requirements of the National Scientific Commission is to be admitted as prima facie evidence in any legal proceeding in which it is relevant. Such a body could develop also a comprehensive system for certifying the proficiency of expert witnesses.

In respect to every species of expert testimony, there is a need for criteria, defining what is possible, what is impossible, and what is acceptable practice, but their development has been restricted chiefly to problems of identification. It is not uncommon to see "experts" making blood group determinations by such impossible methods as microscopic inspection of dried blood smears. It is not a rare thing to see general practitioners postulating injury as the probable cause of some disease, when current medical science would not accept the evidence relied upon as satisfactory.

Indeed, there is a real danger in the fetching term "Scientific Proof," for it may lead us to overconcentrate on the high probative value of this species of evidence, while glossing over serious dangers which lurk in its use.

[101] *Donaldson, Medical Facts that Can or Cannot be Proved by X-Ray; Historical Review and Present Possibilities, ANN. INT. MED., 1943, xviii, 535, 41 Mich. L. Rev. (April 1943) —.

[102] *Riseman, Principles of Electrocardiography, 15 Rocky Mt. L. Rev. (April 1943) —. *Smith and Riseman, Applied Use of the Electrocardiograph in Legal Proceedings, 15 Rocky Mt. L. Rev. (April 1943) —.

[103] See this paper, *supra*, and see *Lennox, Amnesia Real and Feigned, f.n. 50 *supra*.

[104] *Snyder, Criminal Interrogation With the Lie Detector, ANN. INT. MED., 1943, xviii, 551, — Rocky Mt. L. Rev. —.

[105] *Morgan, Suggested Remedy for Obstructions to Expert Testimony, Clinics, 1943, ii, 1627, 20 U. Chi. L. Rev. (April 1943) —.

[106] *Pound, A Ministry of Justice As a Means of Making Progress in Medicine Available for Courts and Legislatures, Clinics, 1943, ii, 1644, 20 U. Chi. L. Rev. (April 1943) —.

[107] Smith, H. W., Cooperation Between Law and Science in Scientific Proof, (June 1941) 19 Tex. L. Rev. 414.

"Scientific Proof" covers a vast range of expert testimony, varying widely in probative value. Certain methods of identification, such as finger-printing, contain only a minute chance of error, either as regards premises employed or actual execution of tests. Next we drop down to such activities as forensic chemistry and blood group work, where premises are scientific, but errors in procedure are more likely. Here there is real risk of mistake if the witness does not have very special qualifications. Handwriting falls a little lower down the scale; Albert S. Osborn has brought this field from art to science, but there is still a component of subjective skill in its application. Forensic Pathology in most particulars holds its own, in probative value, with other trustworthy identification methods. Clinical Forensic Medicine is a blending of science and art, naturally more amenable to method in diagnosis than in prognosis, where facts must be aided by experience and good opinion.

Each species of evidence calls for safeguards and cross-checks, and its own particular criteria of proof, if we are to avoid losing the contribution of science in a welter of opinion. In all those cases in which the proposed expert needs special indoctrination and training, a certificate of proficiency should be required before he is allowed to testify. If evidence is to be founded upon test materials, provision should be made for preservation of this material for independent corroboration studies to settle doubts that might arise in the mind of court or adversary. Lack of any such mechanisms may account for the willingness of courts to say that even if scientific evidence is undisputed, the jury may rely on contrary lay evidence to enter a verdict opposed to the Scientific Proof.[108] Perhaps the particular expert does not look too scientific to the court; perhaps, too, the judge feels that there is no satisfactory cross-examination possible of a complicated procedure. It is well known that most lawyers are not equipped to overthrow this species of evidence, and the danger is enhanced by the fact that a fundamental error may be merged beyond discovery in the standardized routine of a textbook procedure. If the test material were saved, as usually is possible,

[108] In *Arais v. Kalensnikoff*, 10 Cal.(2d) 428, 74 P.(2d) 1043 (1937), 115 A.L.R. 163, scientific evidence based on blood group determinations was uncontradicted that defendant could not be the father of plaintiff's child. The trial court refused to instruct a verdict for defendant and on the strength of lay testimony the jury returned a verdict for plaintiff finding D to be the father of her child. This judgment was affirmed by the California Supreme Court.

In like manner, in *Rex v. True*, 127 L.T. 561 (1922), the Court of Criminal Appeal in England held that a jury was entitled to find that a defendant, under prosecution for murder, was sane at the time he committed the homicide, despite uncontradicted medical testimony to the contrary.

Contra: Schulze v. Schulze, 35 N.Y.S.(2d) 218 (1942). Husband, X, as plaintiff sought a divorce from his wife, Y, defendant, on the ground of adultery. Y contended that child, C, was the offspring of X and that she had not committed adultery. X and Y had been separated for some time, but evidence as to access during the period of separation was conflicting. E, an expert witness, offered uncontradicted testimony that he had performed blood group determinations which showed X could not possibly be the father of C. Held: Though ". . . the presumption of legitimacy of a child . . ." born in wedlock is ". . . one of the strongest presumptions known to law . . ." it is rebutted, and the lay testimony of access overcome by the undisputed scientific evidence of non-paternity. The uncontradicted scientific proof is entitled to control the issues raised.

the trial court could appoint an impartial expert to repeat the procedure or study. If results were consistent, and the scientific evidence were conclusive of the issue, many trial courts would refuse to permit the jury to override such findings.

One result of our present adversary system of trial is that science may be born anew in every lawsuit where two experts disagree. That a scientific principle or finding can be true in A's case and untrue in B's case is squarely opposed to the concept of the universality of scientific truth.[109]

In our more progressive states, if the case turns on a scientific question, and expert X gives uncontradicted testimony that the facts are ABC, the trial judge will instruct the jury that they must return a verdict finding the facts to be ABC.[110] If, however, expert Y disagrees with expert X, the lay jurors are to say which is the preferable view, or to discard both in favor of lay testimony. These are the mechanisms of procedure and trial.

What would P (a member of the public) think if he experienced the following treatment in a modern hospital?

P goes into hospital suffering pain. Dr. X says (testifies) that the pain is due to heart trouble. No one disputes him and the case is treated as one of heart disease.

Assume, instead, that Dr. Y examines P and says (testifies) that P is suffering from gall-bladder trouble. The hospital superintendent, desiring to resolve the conflict, calls in a layman from the street to say whether Dr. X or Dr. Y is to be believed, and on that basis disposes of P's case.

P would be properly shocked at such a procedure, for he would naturally expect that Dr. Z, an even greater consultant (expert referee), would be called into consultation to determine the true facts.

The reader will note that I press always for the conviction that laymen cannot successfully try scientific issues. The layman is apt to import distorted notions of scientific matters into the judging process, and the warping effect is as pernicious whether he gives excessive weight to the evidence (augmentation) or too little (displacement).[111] Three cardinal aspects of evi-

[109] There would seem to be two solutions to this jury trial dilemma:

(1) To cover litigation where a scientific finding should control the outcome of the case, and the undisputed scientific evidence points one way, I would suggest a constitutional amendment empowering the trial judge to instruct the jury to return its verdict in accordance with the scientific proof. The reader will understand that now it is constitutionally impossible for judges to direct verdicts of guilty in criminal prosecutions. This is in contrast with the situation in civil litigation where the judge may instruct a verdict if all the credible substantial evidence points one way.

(2) In states where the court has power to appoint an impartial expert, supplementary legislation might be warranted providing that the scientific findings established in the first trial shall be binding in subsequent litigation arising out of the same general transaction. If an impartial referee system be introduced for trial of scientific issues, one might well argue that a finding on full investigation should be given effect against the whole world.

Under our strongly entrenched adversary system, with stress placed on the varying diligence of litigants and counsel, the first solution proposed would be the more acceptable.

[110] I think it is safe to say that this is not yet the majority rule.

[111] A. *Augmentation:* "Plowden (1519–1584), one of the heroes of jurisprudence, of the growth of the sixteenth century, was a deserter from one of those professions which are built on physical science; he flourished toward the latter part of the reign of Elizabeth. From the report of a cause relative to a mine, he took occasion to unfold to the eyes of his brethren of the long robe the wonders of mineralogy: a terra incognita, as strange to them as America

dence are relevancy, probative value and persuasive value. For a perfectly competent, expert trier of fact, probative value and persuasive value should be the same. The layman naturally cannot grade scientific evidence according to its true probative value, and in consequence he is more convinced by the persuasive or psychological appeal of evidence.[112]

Assuming, as we must, that laymen may continue to try scientific issues for a long while to come, is it possible to make criteria of Scientific Proof universally available in the "valuing" process, even where these have not been put in evidence?

Facts not offered in evidence from the witness stand cannot be considered unless they be proper subjects for judicial notice, and so notoriously known that the court may dispense with the formality of their proof. The doctrine of judicial notice may enable appeal courts to tap new and authoritative criteria of Scientific Proof pronounced by leading spokesmen of medicine and the sciences. This would give to such courts a needed measuring rod to determine whether the expert testimony put forward at the trial was sufficient to support the verdict, thus enabling a more delicate valuation than that afforded by the crude "conflict of testimony" test. The chief difficulty here would lie in the judge's consulting the wrong bootblack,[113] but if we are

had been to their immediate progenitors. 'The theory of mineralogy,' said he, 'is to the last degree a simple one. In sulphur and mercury, the Adam and Eve of the mineral creation, the whole tribe of metals behold their common parents. Are they in good health? The two perfect metals, gold and silver, are the fruits of their embrace. Do they labour under any infirmity? The effects of it are seen in the imperfect metals, their imperfect progeny." Bentham, Rationale of Judicial Evidence (1827) Vol. 1, p. 7. And see f.n. 112 post.

B. *Displacement:* No more striking case could be mentioned than *Mathews v. People,* 89 Colo. 421, 3 P.(2d) 409 (1931). Accused was convicted and sentenced to life imprisonment for having murdered his wife. The vital proof was scientific testimony of a ballistics expert that bullets recovered from the body of decedent were fired from a pistol which defendant admittedly had in his possession continuously. D was a respectable citizen and offered an alibi. On the trial the ballistics expert was allowed to pass the bullets among the jurors who were permitted to look through a hand lens at grooves on the death bullets in determining identity of the pattern with grooves on test bullets fired through the barrel of the recovered pistol. (Proper procedure would have been to use a comparison microscope or to make imprints of the etched grooves by rolling the bullets to be compared over plastic material according to the technique of Moritz.) After the jurors by this dangerously unscientific gross inspection satisfied themselves that the same gun fired both bullets and found accused guilty, members of the appeal court undertook to determine the scientific issue for themselves. The learned members of that tribunal inspected the bullets sent up with the record, admittedly used a different lens from that employed by the jurors, and held that no such grooves were present as would warrant the conviction. On this ground they reversed the judgment. Burke, J. said: "All these bullets are before us. Each of the justices has examined them under a powerful glass (though not the identical one used at the trial) and has been wholly unable to see anything resembling what the witness says he saw and which he assumed to exhibit to the jurors. . . . This court is as capable of passing upon such evidence as the jurors who heard it. . . . Here the sole evidence of guilt is the assertion that certain alleged markings appear upon these bullets. We examine them and find nothing of the kind. Hence the judgment must necessarily be reversed. The thread is entirely too slender to support a sentence of life imprisonment. The evidence is not only weak and uncertain; it is no evidence."

[112] See Smith, Components of Proof in Legal Proceedings, (Feb. 1942) 51 Yale L. J. 537.

[113] This problem has arisen in malpractice actions filed by patients against their physicians for alleged mismanagement of fracture cases. Some courts have held that failure to employ the roentgen-ray in fracture cases is negligence, and that it is so commonly recognized as such that the court will take judicial notice of the fact even though plaintiff offers no ex-

to continue our present system of trial, this would seem to be a lesser evil than cutting the judge off from any usable erudition in his difficult task of appraising expert testimony. The higher the authority for these scientific criteria, the less the risk and the more easily is the doctrine of judicial notice invoked, and these facts, again, argue for some new official commission, Ministry of Justice, or point of reference.

Jurisprudential Use of the Scientific Rationale. In marshalling those ultimate facts which should orientate legal doctrine, model legislation or social policy, science may proffer methods of research, or on occasion the very criteria, for action. A case in point is the legislation authorizing compulsory sexual sterilization. Indiana passed the first statute on March 9, 1907, and up to this moment 30 states in all have enacted such laws. The primary intention of such legislation was eugenic: to prevent carriers of inheritable defects from transmitting them, and thus to protect society from new members pre-destined to insanity, feeble-mindedness or other disabling defect. By vasectomy in case of males, and by tying off the fallopian tube in case of females, specified classes of persons previously committed to state institutions would be rendered safe to reënter society. No one can doubt that sexual sterilization may prove to be a beneficent factor in race eugenics, but it is equally clear that legislative enthusiasm has outrun scientific criticism. This appears from several considerations:

(1) The classifications do not always correspond to diseases recognized as transmissible by heredity. Some statutes set up such categories as "moral degeneracy," a sociological symptom, not a diagnosable medical disease, and not a condition known to be transmitted by inheritance.[114]

(2) The legislation is not bottomed on medical knowledge regarding "inheritable disease," or scientific regard for the feasibility of spotting recessive carriers of the defect.

(3) The legislation touches such a small percentage of the described classes, and often at so late a date, that the eugenic goals of the legislation cannot be achieved. (For instance, only 6 per cent of epileptics are institutionalized.)

Dr. Abraham Myerson shows most convincingly that legislation which rests upon scientific premises can and must be tested by scientific principles.[115] Dr. John Rock has expounded the scientific principles which must be taken

pert testimony to prove that the omission in the particular case was a departure from average medical standards in the community. *Whitson v. Hillis*, 55 N.D. 797, 215 N.W. 480 (1927).

This shows the possible dangers of applying the doctrine of judicial notice to situations which depend on variable circumstances. The English courts have wisely refused to apply judicial notice to diagnostic use of the X-ray. In *Sabapathi v. Huntley*, 1 W.W.R. 817 (1938), on appeal from the Supreme Court of Ceylon, the Judicial Committee of the Privy Council held that whether medical standards require X-ray examination in a suspected fracture case calls for expert testimony since the question depends on varied circumstances such as condition of the patient, character of the injuries and accessibility of apparatus. (Accord: *Boyce et ux. v. Brown*, 51 Ariz. 416, 77 P.(2d) 455 (1938).)

[114] For detailed analyses of the American legislation, and other valuable tabulations, see Landman, Human Sterilization, N. Y. (1932), Appendices, p. 287.

[115] *Myerson, Certain Medical and Legal Phases of Eugenic Sterilization, ANN. INT. MED., 1943, xviii, 580, 53 Yale L. J. (April 1943) —.

into account in arriving at an enlightened social policy toward dissemination of birth control advice.[116]

Private Law Doctrine and Medical Practice. It is a delusion to speak of "Medical Jurisprudence" in referring to the legal problems which arise from the practice of medicine. First, it is customary to reserve the term "Jurisprudence" to connote philosophic ends of law and the main analytical approaches to law as a science. In the second place, law is a roof which shelters us all, and those doctrines which touch the doctor belong to large fields of law. As a rule, they do not express a unique series of principles applicable only to medical men. Liability in damages to a patient allegedly injured by malpractice is governed by the law of Torts[117]; whether or not such conduct was so extreme as to be also a crime is tested by principles of Criminal Law. Rights of compensation of the physician are determined by the law of Contracts, including doctrines of Quasi-Contract.[118] The position of the expert witness is determined by the law of Evidence. What may seem to the doctor to be a separate and distinct body of principles is really an integral part of a systematized field of law. It is surprising how many of the major fields of law contain doctrines which touch upon the doctor's daily life. Medico-legal grounds of annulment or divorce may be pertinent to the proper relief of a patient[119]; the law of Wills must determine the validity and effect of the last will and testament signed by a patient in extremis and witnessed by the physician.[120] The Statute of Limitations may

[116] *Rock, Medical and Biologic Aspects of Contraception: Scientific Contra-indications to Legal Restriction of Contraceptive Advice, Clinics, 1943, ii, 1598.

[117] Smith, H. W., Legal Responsibility for Medical Malpractice, (1941) Jr. Am. Med. Assoc., 1941, (March 8, May 10, May 31, June 14, June 21, July 5) *Scott, Tort Liability of Hospitals, ANN. INT. MED., 1943, xviii, 630, 17 Tenn. L. Rev. (April 1943) —; *Smith, Legal Liability for Non-Therapeutic Surgery, Ann. Surg., 1943, —, —, 14 Rocky Mt. L. Rev. 233.

See, also, re law of damages * Ludlam, Plaintiff's Duty to Minimize Defendant's Liability by Surgery, 17 Tenn. L. Rev. (April 1943) —.

As to legal aspects of agreements not to compete, see *Dodd, Contracts Not to Practice Medicine, ANN. INT. MED., 1943, xviii, 618, 23 B. U. L. Rev. (April 1943) —.

[118] Quasi-contract: Benefit Voluntarily Conferred Due to Mistake of Material Fact: Surgical Services Rendered Gratuitously Under Mistaken Belief That Patient Needed Charity.

X, a man of advanced years, did not appear to be an opulent citizen. He was admitted to the out-patient department of a New York City hospital with little or no questioning as to his financial worth. He was there diagnosed as suffering from prostatic obstruction and treated as a charity patient for six months. His condition then required admission as an in-patient for a perineal prostatectomy. It was assumed that since he was an out-patient he was unable to pay for the operation and he promised to pay only hospital charges for his room and board. Staff surgeons Y and Z performed the operation gratuitously, assuming that X was a charity case, and X received the operation thinking it would be free. One month later X died and it was discovered that he was worth over four hundred thousand dollars. Thereupon, Y and Z filed claims against the estate for surgical fees. (It is a well settled rule of law that if one makes a gift he is ordinarily debarred from charging compensation for the benefit conferred.) Held: Y and Z could recover the reasonable value of their services under doctrines of "quasi-contract": They performed the operation gratuitously on the assumption that X was "necessitous" whereas in fact, through a mutual mistake, X was not qualified to receive treatment "gratis" as a charity patient. Matter of Agnew (Surrogate Ct. N. Y.), 132 N. Y. Misc. 466 (1928).

[119] *McCurdy, Insanity as a Ground for Annulment or Divorce in English and American Law, Am. Jr. Psychiat., 1943, ixc, —, 29 Va. L. Rev. (April 1943) —.

[120] Some interesting English decisions are discussed in Kitchin, Legal Problems in Medical Practice, London (1936), Sec. 7, The Patient Makes His Will.

forever bar an action brought by or against a physician, if the suit be filed too long a time after the cause of action accrued. Tax laws touch the doctor with the same inexorable impact and authority as other classes of society.[121]

It would be too much to ask any doctor to explore the full content, focal and peripheral, of these large fields of law. To guide him, it would seem desirable that this pertinent law be served up to the medical student and doctor on a functional basis, making the daily routine of the physician primary, and pointing out the secondary legal consequences which may attach to given conduct. Such materials could be presented in conjunction with successive subjects of the medical school curriculum, somewhat as shown in the accompanying table.

How may law students be trained to cope with scientific testimony? It is a vain and unnecessary goal to impart a medical or scientific education to the aspiring young trial lawyer. There are, however, fundamental ideas underlying every species of Scientific Proof and these can be conveyed in an interesting and successful manner, in terms of proper approaches to direct and cross-examination. To know the vital premises, and the points where errors are most apt to creep in, to know how to go about weaving the net of proof or exposing its weak strands, to know who are the experts to whom he may resort and what type of aid he may gain from them, these are facts which the graduate of the American law school does not possess. Furthermore, as I think most members of the bar will agree, this training is not easily acquired in the course of trial practice. Such materials could be presented as part of a law school course dedicated to "Trial Practice and Problems of Proof-Making," a fit companion subject for the modern course in Evidence. Proof-making should be regarded as the functional counterpart of the law of Evidence. It should deal with all types of proof in an applied fashion, but with constant regard to controlling principles of substantive law, Procedural Law, the law of Trial Practice, and of Evidence. Such materials might also be brought in by way of illustrating such subjects as Torts, Insurance Law, Damages and Evidence.

Public Law Problems in Medical Practice. The problem of medical care comes into swift contact with public law and constitutional law doctrine.[122]

Most people are familiar with the scientific conquest of syphilis: how Schaudinn discovered in 1905 that it is caused by a spirochaete, the *Treponema pallidum;* how Ehrlich in 1910 contributed to the arsenal of chemotherapy his highly potent remedy salvarsan (arsphenamine); how in 1913 Noguchi demonstrated the constant presence of the treponema in brains of paretics, and how the Wassermann and other blood tests have much simplified diagnosis and enabled early therapy, control and cure. Considering what we now know about this destructive malady, is it not a reproach to social conscience that syphilis is still a rampant disease in these United States?

[121] *Griswold, The Doctor's Federal Taxes, ANN. INT. MED., 1943, xviii, 647, 32 Calif. L. Rev. (April 1943) —.

[122] *Powell, Compulsory Vaccination and Sterilization, Constitutional Aspects, ANN. INT. MED., 1943, xviii, 637, 21 N. C. L. Rev. (April 1943) —.

SCHEME FOR PRESENTING LEGAL PROBLEMS OF MEDICAL PRACTICE IN CONJUNCTION WITH SPECIFIC SUBJECTS OF THE MEDICAL CURRICULUM

1. *Anatomy:*
   1) Legal use to establish identity:
      a) Criminal law: to identify body of murdered person in establishing "corpus delicti."
      b) Civil law: to identify persons entitled to property or insurance.
   2) As subject of cross-examination in trying to discredit expert witness.

2. *Physiology:*
   1) Legal aspects of "deception tests" and other physiological procedures.

3. *Bacteriology:*
   1) Legal aspects of blood group determinations and forensic immunology.

4. *Pharmacology:*
   1) Narcotic laws: chief requirements and criminal liability for infraction.
   2) Malpractice: civil responsibility for negligent use of drugs.

5. *Pathology:*
   1) Rights in dead bodies: legal responsibility for wrongful autopsy.
   2) Right to dispose of one's body by contract or will.
   3) Liabilities of clinical pathologists who supervise production of biological materials.
   4) Coroner's office and Medical Examiner system as devices for investigating cause of "sudden death."

6. *Physical Diagnosis:*
   1) Malpractice: legal responsibility for negligent diagnosis.
   2) Compromise settlements and releases: mistaken (non-negligent) diagnosis as basis for setting such settlements aside.

7. *Surgery and Anesthesiology: Malpractice:*
   1) Legal aspects of preoperative procedures.
   2) Legal aspects of operative procedures.
   3) Legal aspects of postoperative procedures.
   4) Special problems in treating fractures.

8. *Medicine:*
   1) Malpractice problems in the practice of internal medicine.
   2) Legal aspects of "false imprisonment."
   3) Legal aspects of "libel and slander."
   4) Business problems in medical practice:
      a) Rights of compensation of the physician.
      b) Sale of a business practice.
      c) Legal aspects of various types of business organizations.
      d) Antitrust laws.
      e) Tax problems.
   5) Main doctrines of Workmen's Compensation insurance; of Life, Health, and Accident insurance; of the law of Damages; and of the law of Evidence, which the doctor as expert witness should know.

9. *Roentgen-ray; Electro-cardiograph; Electro-encephalograph; Lie Detector, etc.:*
   1) Malpractice: special problems arising from dangerous properties of roentgen-ray and radium.
   2) Evidentiary uses in legal proceedings.

10. *Preventive Medicine, Public Health, Public Law and Social Problems:*
   1) Main constitutional law principles in relation to "Food, Health and Drink."
   2) Law relating to public health authorities and practice of preventive medicine.
   3) Legal aspects of medical care; legal problems involved in "Medical Economics."
   4) Premarital examinations.
   5) Medico-legal grounds of annulment and divorce.

11. *Medical Specialties:*
   1) Special legal problems, as for example:
      a) Obstetrics (birth control advice and practice; therapeutic and non-therapeutic abortion; voluntary and compulsory sterilization).
      b) Forensic psychiatry.

Laws providing for compulsory physical examination once a year of the main systems of every man, woman and child will not shock the populace so much as this continued inefficiency. The Supreme Court which upheld

compulsory vaccination [123] and compulsory eugenical sterilization [124] could be expected to uphold such legislation as an intelligent exercise of state police power necessary to protect that most valuable community asset, the public health. Diagnostic centers might be erected at suitable places throughout the land, under proper legislation, to enable the general practitioner to gain those advantages in identifying obscure diseases which are now confined to hospitals or clinics because of the cost considerations.

Such advances will not injure the position of the doctor, but will increase the volume of medical care, raise the level of scientific medicine by closing the gap between general practice and clinical practice,[125] and bring substantial benefits to each citizen, partially at public expense. No one disputes the desirability of extending horizons of medical practice, and medical men are not so reactionary toward new risk-sharing ideas as some laymen might suppose. These innovations must come in a sound and orderly course, but all can see the current of the times and none can hold it back. Workmen's Compensation Laws, once regarded as a breath-taking social innovation, are now under heavy attack because the allowances for incapacity are too low.[126] The whole problem of economic security, so far as the wage earner goes, may prove to be inextricably bound up with adequate health insurance.[127] Increasing the breadth and range of medical care does not require "socialized" medicine or undesirable disturbances of the control or pattern of medical practice.[128]

[123] *Jacobson v. Commonwealth of Massachusetts*, 197 U.S. 11, 25 Sup.Ct. 358 (1905).

[124] *Buck v. Bell*, 274 U.S. 200, 47 Sup.Ct. 584 (1929).

[125] Many communities and doctors are confronted with this problem. Dr. Warren F. Draper comments on how many young physicians become discouraged by lack of a satisfactory solution and leave private practice for the public health service to regain contact with the full play of scientific methods. Draper, Report of the President (Oct. 1942), 17 Harv. Medical Alumni Bull. 4. The general practitioner cannot afford many of the new instrumentalities for diagnosis and treatment, and frequently this circumstance will force him to surrender the patient to better equipped hospitals.

[126] Wilson and Levy, Workmen's Compensation (1941), Volume II, The Need for Reform.

[127] Recognition of this fact is one conclusion of the recently completed study of Sir William Beveridge on social insurance and allied services, a 300 page report published by H. M. Stationery Office on Dec. 1, 1942. This study, undertaken at the request of Arthur Greenwood, then Minister Without Portfolio in charge of post-war reconstruction, is concerned largely with means for attaining freedom from want. It bids fair to establish new patterns of thought in England regarding needs for more adequate health and workmen's compensation insurance. For American edition of this report, see Beveridge, Social Insurance and Allied Services, N. Y. 1942, Macmillan Company.

[128] Every individual has a legitimate interest in the betterment of medical services, but all plans should take into account certain ideals and convictions widely held to be of fundamental importance, these being:

(1) There should be no restraint on the opportunity of the medical practitioner to advance according to his merit and special ability.

(2) There should be no such regimentation of medical practice as will remove individual incentive, cause all methods to become stereotyped or interfere with full expression of experimentation.

(3) Control of medical practice and safeguarding of standards should be reposed in the medical profession and not be made a subject of bureaucratic administration.

(4) The economic position of the doctor should be protected in respect to the services which he performs. In the final and fully expanded program of medical care certain to emerge, society should underwrite adequate medical service without having the more unfortunate patient compelled to rely upon charity.

Coöperation of Law and Medicine. History is full of cases where doctors or lawyers have mingled their traditions in some fascinating and useful way.[129, 130, 131, 132, 133]

I like to think upon the affinities of the lawyer, the doctor and all those who probe the sciences. All are bred in the tradition of strict skepticism, all have a respect for the best evidence available to prove an issue, and all must leave the cloistered shelter of their researches to perform the practical tasks of life. By virtue of their strict training and their habitual realism, they are fit to be illuminators of social good as well as prime movers.

These three together, the lawyer, the doctor, and the man of science, can reduce the discordant noise now produced when the striking iron of science meets the anvil of the law. The blacksmith shop may yet become a modern assembly plant, and all three may find themselves companion toilers on a more intricate pattern called "social synthesis."

(5) The extension of medical care, particularly in regard to preventive medicine, might well be implemented by enlightened legislation, consonant with public opinion, arranging for the routine examination of the entire populace at periodic intervals, with provisions for hospitalizing and treating those suffering from contagious disease. At this stage of social evolution, it might be better left to individual choice whether a person suffering from non-contagious disease, constituting no menace to his fellow citizens, should receive curative treatment. In any event we must not confuse this wholesome social planning with either autocratic regimentation or with socialized medicine, for the essential premise simply goes back to the adequate protection of the body social by intelligent use of the means at hand.

[129] As joint authors they have produced treatises on law-medicine problems. The first of these, Medical Jurisprudence, by J. A. Paris, M.D., Fellow of the Royal College of Surgeons, and J. S. M. Fonblanque, Barrister at Law, was published in London, in three volumes, in 1823.

[130] John Hunter, 1728–1793, failed to maintain his great reputation when giving evidence for the defense in the trial of Donellan (1781) for the poisoning of Sir Theodosius Boughton with cherry laurel water. That one of his medical attainments was able to render such little assistance in the administration of justice, made a deep impression. It may have prompted the efforts of Andrew Duncan which caused a chair of medical jurisprudence to be founded in Edinburgh University in 1807, the first in the British dominion.

[131] In contrast, Sir James Paget (1814–1899), the rare Scotch surgeon who described Paget's disease, made a profound impression as an expert witness in the early and important malpractice case of Perionowsky v. Freeman (Court of Queen's Bench, 4 Foster and Finlason 977 (1886)). He explained the division of labor between nurse and visiting surgeon in an illuminating way, and the court did not hesitate to declare it as law that a hospital nurse, alone, is responsible for negligence in carrying out merely ministerial duties, such as giving the patient a bath. Unless the negligence goes on in his presence without objection, the surgeon cannot be held for her carelessness in having the water too hot and thereby scalding the patient.

I might mention, too, Ambrose Paré, the father of French surgery, who published in 1575 his work on monsters, simulated diseases, and a method for preparing medical reports.

[132] Clark Bell, born in Jefferson County, N. Y., in 1832, became an eminent lawyer. He was counsel for promoters of the Union Pacific Railway Company, and as such prepared the enabling acts passed by Congress, under which the road was constructed. He was deeply interested in law-medicine coöperations, served for several years as President of the Medico-Legal Society of New York, established its library, founded the "Medico-Legal Journal" in 1883, and in 1885 represented North America at the conference in Antwerp convened to develop an international classification of mental diseases.

[133] Marshall Hall was a colorful English barrister of the past generation. Son of a doctor, he was named for Marshall Hall, the great English physician of the nineteenth century. As a young man Marshall Hall made himself an authority on materia medica, and he put this knowledge to repeated use in his trial work. His special talents led him to be engaged as counsel in a series of celebrated causes, including the trial of Frederick Henry Seddon at the Old Bailey in 1912 for alleged poisoning by arsenic. He was deeply interested in all species of Scientific Proof and made a prize collection of fire arms and lethal weapons. See Marjoribanks, The Life of Sir Edward Marshall Hall (1929).

CLINICAL APPROACH TO ALLEGED TRAUMATIC DISEASE *

By Leopold Brahdy, M.D., and Samuel Kahn, M.D.,
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Every part of the body is daily subject to all kinds of minor traumata, of which the individual is usually only vaguely conscious. When, following any such trauma, undue symptoms appear, the patient promptly recalls the recent injury and tends to attribute to it the condition from which he suffers. If the accident was an unusually dramatic one, a patient will be even more convinced that his condition resulted therefrom, even though it occurred long before the symptoms became manifest.

In eliciting the history in such a case, it is important to remember that the patient's opinion as to the relationship between an injury and a subsequently developing disease is often sincere. Many women give a history of having struck the breast only a day or two before they became aware of the presence of a breast tumor. With no conscious or subconscious motives to influence them, they are convinced that that trauma is the cause of their condition. To the examining physician, whose knowledge is based on the biology of tumor growth, it is obvious that the tumor mass must have been of palpable size for weeks before the contusion and that it must have existed, though smaller, for many months. The physician should assume that his patient's opinion and history are sincere unless there is unquestionable evidence of conscious malingering. By such an attitude the physician may be able to induce the patient to recall hitherto untold facts, which may furnish a sounder basis for an opinion on causal relationship and which may even change the patient's own conviction.

The patient's conviction rests on the principle of *post hoc propter hoc*. All of us are heirs to this ancient fallacy. In guarding against it, the physician may easily fall into another error, i. e., refusal to accept a cause and effect relationship, because he cannot visualize the steps in pathogenesis whereby the results of the injury become manifest as the disease. He may become so exacting in his demand for scientific standards of evidence that he often completely ignores clinical experience. And yet, the question of causal relationship between trauma and disease is largely a clinical problem. It is part of the clinical study of the etiology of disease.

In this, as in any other medical problem, the physician eagerly seeks the help of the pathologist, the laboratory worker and the statistical analyst, but he must depend primarily on accurate and detailed clinical observation. Records of court verdicts in other similar cases should not influence his opinion. The conclusions of a lay jury and of a learned judge can have

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little value in the determination of the etiology of disease. The physician must rely solely on medical data and on prevalent medical authority. If litigation is involved, he must completely ignore the effect his opinion may have on the patient, the lawyers and the tribunal. Whether a plaintiff, a defendant, or a Court seeks his advice, conclusions reached by the physician must be based solely on the facts and must be identical in content and in emphasis.

When a physician who does not specialize in traumatic medicine or surgery is called upon to treat an injured person, he is interested only in the immediate medical problem, and pays no attention to a possible medico-legal sequel. How the accident occurred, and where, and why, and what parts were injured aside from those requiring treatment are questions of little importance to him. But long afterwards, when a lawyer is consulted, in a suit for damages or compensation, the details concerning the accident and the injury may become paramount. Especially is this true if the patient later has a disease which may or may not have resulted from the injury sustained.

With relatively few exceptions, there is no one exclusive cause of disease. Several factors, in varying combinations, act as synergists, and produce the conditions under which a disease develops. Of these factors, one may be a constant, like the bacteria in infectious diseases. But this constant factor alone will not necessarily produce its disease. The tissues of the body must permit the invading bacteria to grow and multiply. If the body is too resistant, the bacteria will die, and the disease will not develop. If, however, there is insufficient body resistance or if the bacteria light on some devitalized tissue, they will there find a favorable site for growth, and disease will appear. This inconstant, secondary factor of resistance is, therefore, as important as the specific bacteria.

Malnutrition is often a non-specific, secondary factor whose effects are better known than those of trauma. A review of the rôle of malnutrition may suggest the proper approach to the study of trauma.

Malnutrition is the direct cause of certain diseases—scurvy, neuritis, rickets. It is a secondary factor in producing other conditions, for example, pulmonary tuberculosis, although many cases of tuberculosis develop without it and although most undernourished people do not develop tuberculosis. Malnutrition, therefore, is not a constant factor in the etiology of tuberculosis but is a recognized one in some cases. The malnutrition may, on the other hand, be the result of the disease, rather than one of its causes. Malnutrition may also co-exist with tuberculosis without affecting it or resulting from it. No generalization on causal relationship should be applied in the case of an individual who is tuberculous; each case must be studied separately.

Like trauma, malnutrition is a primary or secondary cause of many conditions, but there are some in which it plays no part. Hodgkin's disease occurs in the hungry as well as in those who are well nourished. Though little is known of the cause of Hodgkin's disease, in any specific case no

physician would hesitate to assert that malnutrition did not cause or activate or accelerate it.

Again, like trauma, malnutrition is of varying degrees and of various types. Deficiency of one vitamin may be the cause of a specific disease which could not be caused by a general reduction in diet. The disease must be accurately diagnosed, as well as the type of malnutrition afflicting the patient, before any conclusion as to the causal relationship between them can be reached.

As a factor in the causation of disease, trauma should be studied in the same way as malnutrition. The literature on the relationship of trauma and disease has increased in the last decades, but much still remains obscure. Certain diseases in which trauma was believed to play a part are now known to be entirely unrelated to it. Other conditions, it is now known, may be caused by trauma: a skin burn can produce a duodenal ulcer; a back injury, with negative roentgen-rays six days after the accident, may be the cause of a compression of the body of a vertebra found six months later.

The rôle of trauma, like that of malnutrition, is analogous to that of any other inconstant, nonspecific factor in the causation of disease. An injury may be the direct cause of a disease, as in the case of septicemia resulting from a puncture wound; it may precipitate the symptoms in a previously asymptomatic condition, such as tabes or general paresis; it may accelerate an existing disease, for example, pulmonary tuberculosis; it may only temporarily aggravate a chronic process, such as diabetes mellitus; it may result in serious, acute damage because of the presence of an underlying chronic condition, as the production of gangrene by moderate trauma in the presence of obliterating thromboangiitis; it may direct the attention of the patient and physician to a preëxisting disease which was unaffected by the trauma, as when examination of the breast, following a mild contusion, reveals the presence of a neoplasm. Finally, the possibility of a disease causing an accident, instead of a trauma influencing a disease must be considered, for example, a spontaneous pneumothorax, due to the rupture of an emphysematous bleb, can cause the operator of a car to lose control of it, with resulting serious injury to himself.

According to their relationship to trauma, diseases may be divided into three classes:

1. Those which are practically always the result of injury. When a patient sustains a contusion, a laceration or a fracture, the physician can express an opinion on causal relationship without undue deliberation, since such conditions belong to the group which are almost always traumatic in origin. Since the relationship of these diseases to trauma is clear, they will not be considered further in this discussion.

2. Those which are never the result of trauma. In some diseases, such as measles, this is obvious. In others, as for example, colloid goiter, the problem is more complicated. The clinical evidence of the rôle of trauma

must be evaluated; statistical analyses of series of cases, experimental laboratory reports, and the pathology of the disease must all be given due weight. If it is decided that trauma never plays any part in the development of a disease, then it belongs to this second group. Obviously, in any specific case of such a disease, the question of causal relation to trauma must be answered in the negative.

3. There remains a group of diseases which usually develop spontaneously, but in which trauma may be a causative factor, such as myocardial infarction, duodenal ulcer, and abscess of the kidney. In this group of diseases the question of causal relationship must be considered separately in each individual case.

We shall indicate the facts which may have a bearing on the relationship of an injury to a subsequently appearing disease, and outline the principles upon which the reasoning is based. The facts to be considered are the following:

1. The diagnosis of the disease.
2. The physical and mental condition of the patient prior to the injury.
3. The injury, its type, its site, and its severity.
4. The immediate objective and subjective effects of the injury.
5. The intercalary period—also called the latent period or the time interval.
6. The bridging symptoms.
7. The biology of the disease.

Accurate Diagnosis. Before an opinion on causal relationship can be reached, it is essential to diagnose the condition from which the injured patient is suffering. Diseases due to trauma must be differentiated from those with somewhat similar symptoms which are unaffected by trauma. When a paresis of the injured arm was found in an elderly man who some time before had sustained a simple Colles' fracture, it was necessary to determine whether the paresis was the residual of an old hemiplegia or a hysterical manifestation. If it was a hysterical manifestation, the injury may have been its cause. When symptoms suggestive of Parkinson's syndrome are found after an injury to the head, it must be borne in mind that true paralysis agitans is not traumatic in origin, but that a severe injury of the basal ganglia may produce signs and symptoms similar to those of true paralysis agitans. Accurate diagnosis is obviously fundamental in deciding on causal relationship in such a case.

Frequently, reëxamination of the patient at intervals may reveal data helpful in establishing a diagnosis, and, equally important, in determining the stage of development of the disease and its post-traumatic course. If, following a fracture of the ribs, tuberculosis of the lung is found, and the lesion runs an unfavorable course thereafter, the question of traumatic activation of a quiescent condition must be carefully considered; but if the lesion progresses toward healing, it may be concluded that the fracture caused neither aggravation nor activation of the preëxisting tuberculosis.

The Condition of the Patient Prior to the Injury. Because periodic routine medical examinations are infrequently made, a precise knowledge of an individual's pretraumatic status is usually lacking. The increasing trend toward preëmployment and periodic examinations may make available, in the future, many important data concerning the status of individuals prior to their injuries. Records of previous medical examinations will throw light on many obscure cases, but they can also be misused. When men are examined superficially because of lack of time required for careful study, it is improper to use such examination records to prove the absence of some obscure ailment, whose discovery depends upon meticulous investigation.

When data concerning the patient's condition before the injury are not available, an attempt must be made to estimate that condition on the basis of the clinical history, the findings immediately after the injury, and the patient's past activities. Where litigation is pending, too much reliance should not be placed on an uncorroborated history, since some patients may conceal a preëxisting condition in the hope of benefiting their claims. A man who did satisfactory work, which required much strength and exertion, was clearly not suffering from cardiac insufficiency. Should symptoms of decompensation develop soon after a severe chest injury, a causal relationship between the two is probable. A claim that epileptiform seizures resulted from an injury must obviously be considered fraudulent, if the coworkers of the patient had seen him in similar attacks before the injury. If a lung cavity is found by roentgenogram or clinical examination immediately following an accident, it is evident that pulmonary tuberculosis preëxisted.

There are many difficulties in estimating the pretraumatic condition of an injured person. As the statements of the patient and his friends cannot be wholly relied on, the conclusions reached concerning the prior status of the patient can only rarely be definite.

The Injury—Its Type, Site and Severity. Having determined, as far as possible, the status of the patient before the accident, the physician should consider how the injury occurred—the physics of the injury—exactly what happened. Experience and patience are required to induce a person to describe the exact site of the injury, and to obtain the data necessary for a determination of the severity of a blow. If the injury was caused by a falling object, an effort should be made to discover its size and weight and the distance through which it fell. If the injury resulted from a strain, the size and weight of the object lifted, as well as the position of the patient, may furnish a clue to the severity of the strain. The necessity for determining the severity of an injury need not be stressed. The late effects of a severe blow or strain are as different from those of a light one as are the immediate effects.

Traumata are of several kinds: direct (blows or falls), indirect (strains or twists), and psychoemotional. In certain diseases, for example, duodenal ulcer, a direct blow many be a determining etiological factor, whereas an

indirect trauma is not. In others, the converse is true. The effects of psychoemotional traumata are often far reaching, even though associated with little physical injury. Toxic thyroidism is the most dramatic example of organic disease resulting from psychic trauma.

A disease which is caused by an injury usually will manifest itself at the site of the injury. It is essential, therefore, to discover just where the force of a blow was exerted, or where its force may have been projected.

The greater the distance of the disease from the site of the injury, the less is the likelihood of any causal relationship. A blow in the lumbar region may result in tuberculosis of the kidney; a blow to the head may precipitate the symptoms of general paresis; but a blow on the thigh can have no direct effect on either condition.

There are exceptions to this general principle that a pathologic process resulting from an injury manifests itself at the site of the injury. When a thrombus is liberated because of a trauma, the embolic effects of the thrombus will appear far from the site of the trauma. When the skull or chest is injured, the effect of the injury may be projected to a point opposite the site of injury—the point of contrecoup.

The Immediate Effects of the Injury. In considering whether a disease has been caused, precipitated or accelerated by a trauma, the signs and symptoms which appeared immediately after the trauma should be carefully scrutinized, and the extent of the immediately resulting disability determined. The patient should be permitted to narrate the circumstances of the accident and its immediate consequences before specific questions are asked. In his digressive and often irrelevant rambling, he may describe important events which might have been omitted in the course of the examiner's formal inquiry. Allowances must be made for the tendency on the part of the injured person to exaggerate his symptom and to overemphasize his physical defects, especially when litigation is pending. Some individuals exaggerate and dramatize their symptoms in every illness. The patient with a claim for damages should not be expected to recite his history and enumerate his symptoms more accurately than does a patient who suffers from a nontraumatic condition. The physician must sift the history and subjective symptoms, rejecting what appears to be false, accepting what seems reasonable and discounting tactfully and patiently what is exaggerated.

In getting a history from a patient about the immediate effects of an injury, it is well to avoid leading questions. "Were you unconscious after you fell?" will elicit the answer "Yes," if there is intentional exaggeration. However, "What did you do after you fell?" may elicit from the same person the answer "I felt to see if my head was bleeding" or "I shouted for help." The last two answers indicate that there was no unconsciousness, a fact which may have an important bearing on the question of causal relationship.

Whenever it is possible to discover them, physical signs are more reliable criteria of the immediate effects of an injury than are the patient's

history and complaints. A hematoma, or a disturbance in reflexes, or an abnormality of a joint is more significant than is a complaint of weakness or of pain in the extremity.

Whenever there are witnesses to an accident, lawyers or investigators inquire minutely into the events preceding the accident and into the accident itself. This evidence is important, of course, for legal, and even for some medical purposes. Too often, however, investigators neglect to obtain a description of the patient's actions and appearance immediately after the injury. Such information is of great medical value. If this information were more carefully sought and submitted to the physician, medical opinion on causal relationship would be more easily reached and more accurate and valuable. These immediately post-traumatic signs and symptoms constitute the best gauge by which to determine the severity of the injury. The extent of disability following an accident is an indicator of the intensity of the resulting pain and of the presence of dysfunction of one or more of the vital organs. A claim that a strain resulted in an attack of angina pectoris may be considered, if the patient suffered such immediate severe pain that he was disabled. If he continued at his work, the claim is not plausible. Traumatic epilepsy can be caused by brain injury severe enough to have produced unconsciousness. If the injured person was neither unconscious nor disabled after the accident, it can be concluded that the injury probably bears no relationship to a later appearing epileptic attack.

The Intercalary Period. The time interval (latent period, intercalary period) between the occurrence of a trauma and the appearance of symptoms and signs of the resultant disease is analogous to the incubation period of infectious diseases. In infectious diseases a certain time elapses between the invasion of the body by the infecting organism and the clinical manifestation of the disease. This time, within known limits, is specific for each infectious disease. During this time the organisms grow and spread and finally produce their disease. Similarly, in traumatic disease, a time interval is necessary for the development of the pathologic process initiated by the trauma. This interval, like the incubation period in infectious diseases, varies with the disease which the trauma has produced. The upper and lower limits of this developmental period are not definitely established in many pathologic conditions, and consequently, wide leeway must be allowed in specific cases.

In some conditions the time interval is always short, as in angina pectoris following a strain. In others, it is long, as in traumatic epilepsy. In still others the intermediate period may vary from a few hours to a few months or longer, as in septicemia. Since this disease is an extension of a local infection, it can occur long after the appearance of the local traumatic infection, and even long after the local condition has been apparently healed.

When an abscess is found an hour after an injury, or when a renal calculus is found after a few days, there can be no causal relationship between the injury and these conditions. The time interval is too short.

Both the abscess and the kidney stone require a longer time to develop. A preëxisting kidney stone, however, may be dislodged by a trauma, which precipitates the symptoms of renal colic. If that occurs, the symptoms of the colic must appear almost immediately after the trauma. Should they appear after the lapse of a few days, they cannot be attributed to the trauma; the time interval is too long.

In many conditions, such as tuberculosis of the kidney, traumatic epilepsy, ureteral stricture, the trauma initiates a pathological process which is relatively asymptomatic, and which produces symptoms of the usually non-traumatic disease only after a long intercalary period.

Bridging Symptoms. The injury, its immediate effects, and the time interval having been considered, attention must be given to the symptoms which manifest themselves in the interval between the time of the injury and the first appearance of the resultant disease. It is important to know the time of appearance of each symptom and of its recession, but it is frequently difficult to fix the patient's attention on this temporal sequence. An injured person often remembers the date of the first appearance of those symptoms which persist, but he is usually inaccurate about those symptoms which came and went.

After the acute symptoms directly due to the trauma have subsided, and before the patient is ill with the ensuing disease, intermediate symptoms may appear. They are known as bridging symptoms. These symptoms serve as signposts to the physician that some condition is developing, the nature of which has not yet become clinically manifest. The presence or absence of these interval symptoms often is the determining factor in the final decision on the probable relationship of injury and disease. It must, of course, be definitely established that none of the slowly emerging signs and symptoms was present prior to the injury. In some diseases, for example pulmonary tuberculosis, the diagnosis of tuberculosis may not have been made until many months after the injury occurred, but careful questioning of the patient may show that mild symptoms were present during this long interval or, possibly, even before the accident. In some diseases, if there is a continuity of symptoms and signs from the time of the injury to the clinical appearance of the disease, there may be causal relationship between the two; in other diseases, the reverse is true. For example, syphilis may appear at the site of an earlier fracture of a bone. Causal relationship is plausible, if the condition was not physiologically cured for a long time following the fracture, as evidenced by persistent circulatory disturbance at its site, with resultant swelling and pain, which became more intense until syphilitic bone changes appeared. In tuberculosis of bone, on the contrary, if caused by an injury, there is usually a free interval after the signs of injury have disappeared and before the symptoms of the bone tuberculosis are manifest.

The Biology of the Disease. The pathologic process which is the basis of the disease precedes its first signs and symptoms. On the basis of these first clinical manifestations, the physician must estimate the date at which

this pathologic process was initiated. In order to conclude that the intercalary period is consistent with causal relationship between trauma and disease, or that it is too long or too short to be consistent with causal relationship, the physician must know the early stages of the biology of the disease.

An opinion on whether the trauma accelerated or precipitated the disease requires a picture of the course of the disease in the traumatized patient, both before and after the trauma occurred. In order to judge whether there is a change due to trauma, the physician must know the usual non-traumatic mode of onset of the disease, its usual course, the ordinary variations from this course, the average frequency of recurrences and exacerbations, and the end results when that disease is uninfluenced by secondary factors such as trauma. Only with this knowledge can he judge the possible effect of trauma. If, after injury, tuberculosis of the lungs is stationary, or if it progresses slowly toward healing, it is reasonable to conclude that the trauma had no aggravating effect on the disease. The appearance of minor symptoms after trauma or slight increase in symptoms is ignored (from our standpoint) because tuberculosis normally shows minor variations in symptoms even under the best conditions. It is, therefore, not reasonable to ascribe such changes to a secondary factor—trauma. If a previously asymptomatic pulmonary tuberculosis spreads rapidly after an injury, however, there is ground for considering the question of the trauma accelerating the previously quiescent pathological process. The fact that a disease process becomes worse following a trauma is not in itself sufficient evidence that the trauma accelerated the disease. Cancer of the stomach will grow and metastasize without any intercurrent injury, just as it will following injury.

Rarely are all the medical data complete, and, even then, there are uncertain factors which enter into the determination of the causal relationship between trauma and disease. In view of the diversity of well considered opinion in some diseases, in view of the difficulty of obtaining even from honest patients a precise history of their condition before and after trauma, in view of the fact that some patients may exaggerate or lie in order to support their claims for damages, no one should express an opinion on the relationship between a trauma and an ensuing disease without careful study of the specific case. A more extensive literature of carefully studied clinical and pathological material will be a potent aid to physicians, perhaps enabling them one day to speak categorically on causal relationship. At present, the evidence and knowledge obtainable usually permit a physician to conclude only that a trauma probably did or probably did not produce, precipitate or accelerate a disease. Nevertheless, a physician should not hesitate to state his conclusion after study of all the factors we have discussed. It is not necessary to equivocate, even though our knowledge of the secondary factors in the etiology of disease, such as trauma, does not yet constitute an exact science.

PROBLEMS OF PROOF IN CLAIMS FOR RECOVERY FOR DERMATITIS *

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WORKMEN'S compensation laws are designed for the purpose of reimbursing the worker for loss of earnings and cost of medical care resulting from occupational injuries or occupational diseases. This immediately brings up the question of a definition of an occupational disease.

Many definitions have been given and, as is the case with most definitions, objections can be made to all of them. Among those suggested are the following:

1. An occupational disease is one which occurs as a result of exposure to a recognized specific occupational hazard. It must have the accepted physical signs and symptoms of the specific disease caused by exposure to the specific occupational hazard.

This definition leaves no room for inclusion of newly discovered occupational diseases, nor for old ones with unusual or newly discovered symptoms and physical signs.

2. Occupational diseases are abnormal bodily or mental states directly resulting from exposure to harmful substances or conditions directly related to work (McCord).

This is a broader definition, but still leaves open the question of "harmful substances or conditions."

3. Occupational diseases are the outcome of long exposure to noxious influences during work occurring with particular frequency among workers in a specific industry.

This definition would leave out occupational diseases caused by short exposures to noxious influences, such as dermatitis [1] caused by primary irritants, cyanosis [2] which may be caused by short exposure to aniline,[3] or caisson disease [4] which may be caused by rapid decompression. Such diseases would have to be classed as occupational accidents, because of their sudden onsets. Compensation should be given for disease caused by the occupational environment rather than for diseases coming within the terms

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1 Dermatitis—inflammation of the skin.

2 Cyanosis—a bluish discoloration of the skin, particularly noticeable in the nail beds and lips, due to inadequate oxygenation of the blood.

3 Aniline—an organic compound widely used as the starting point for the synthesis of such substances as dyes, medicinals, etc.

4 Caisson's disease—a condition affecting individuals who are too rapidly subjected to decreased atmospheric pressure, such as deep sea divers coming to the surface or airplane pilots ascending too rapidly.

of the above definitions. For instance, if it can be proved that a worker contracted typhoid fever[5] from drinking polluted water at his place of employment and nowhere else he should be entitled to compensation, regardless of the fact that typhoid fever is not classed as an occupational disease, and regardless of whether his employer was or was not at fault in supplying such water.

State compensation laws[1,2] are not uniform but can be grouped into three classes:

1. The schedule method in which only certain specially named diseases are compensated, with a description of the process in which the disease must occur in order to be compensable. (Del., Mich., Minn., N. J., N. Y., N. C., Ohio., Pa., R. I., Wash., Ky., Mass., Neb., W. Va.)

2. The general or blanket coverage method in which any and all occupational diseases are compensated, without defining the term occupational disease. (Calif. Mo., N. D., Wis.)

3. The general coverage method, with a statutory definition of the term "occupational disease." (Conn., Ill., Ind.)

Although occupational dermatitis is mentioned specifically in only a few of the State compensation laws, nevertheless it can be included in most of the above classes and even in the compensation laws of those States in which only occupational accidents are compensated. This is so because the hearings before compensation boards are informal, the laws are broadly interpreted, and the worker always gets the benefit of the doubt. Moreover, compensation commissions are not only referees, but investigators. Since dermatological investigation is necessary to diagnose and determine the cause of dermatological conditions, all compensation commissions should have available at least one impartial dermatologist[6] who is specially versed in occupational skin diseases. The duty of such a dermatologist would be to inform the commission in regard to the following: (1) Do the working conditions present an actual occupational dermatitis hazard? (2) Has the worker an occupational dermatitis? (3) What is the actual cause of it? (4) Was it contracted at the place against which the claim is made? (5) Is or was the employee disabled by it? (6) Give an estimate of the time of disability. (7) Express an opinion as to measures to be employed to prevent the recurrence of the condition. (New occupation; protective apparatus or clothes if worker returns to same occupation.)

All dermatoses which affect workers are not necessarily of occupational origin; therefore, a worker claiming compensation for an allegedly occupational dermatitis must prove its occupational origin. Here we must differentiate between a dermatitis directly caused by the worker's occupation

[5] Typhoid fever—a specific bacterial disease frequently acquired from drinking water that has been contaminated with excreta from a person harboring the causative organism.

[6] Dermatologist—a physician specializing in diseases of the skin.

and one which is caused not by the occupation but by the occupational environment. For instance, if a worker is exposed to a skin irritant in the course of his work and as a result contracts a dermatitis on the exposed parts, that dermatitis is directly occupational; but if the worker contracts a dermatitis of his buttocks, because he is sensitive to the paint or wood of the toilet seat [3] which he uses at his place of work the dermatitis is caused by his occupational environment and not by his occupation.

It is desirable to learn whether an occupational dermatitis is caused by a substance which will cause dermatitis on any one under similar working conditions, or whether it is caused by a substance which will affect only certain workers who are sensitized to it. In the first case, the substance is designated a *primary skin irritant;* in the second, a *sensitizer. A primary cutaneous irritant* is an agent which will cause dermatitis by direct action on the normal skin at the site of contact if it is permitted to act in sufficient intensity or quantity for a sufficient length of time. *A cutaneous sensitizer* is an agent which does not necessarily cause demonstrable cutaneous changes on first contact but may effect such changes in the skin that, after five to seven days or more, further contact on the same or other parts of the body will cause dermatitis.[4]

The physician not versed in occupational processes and occupational skin hazards does not usually go to any great lengths in examining the occupational hazard or history of the patient before making a diagnosis of occupational dermatitis. This is especially so in states where the compensation laws do not require adequate diagnostic criteria and are so worded that if a physician undertakes to treat a worker and makes a diagnosis of occupational dermatitis his fee is guaranteed by the compensation commission or the insurance carrier. But if he makes a diagnosis of non-occupational dermatitis, he must look to the patient for his fee. This encourages diagnoses of occupational dermatitis.

There is no one factor on which a diagnosis of occupational dermatitis can be made. All of the following factors must be considered and properly evaluated.

1. History. This must show that such a dermatitis was not present before the patient entered on his present occupation. It must show that the dermatitis developed during a period of occupational exposure or after a lapse of a reasonable incubation period following the cessation of exposure. This period should not be under a week. If the physician knows that other workers similarly employed are similarly affected, then the diagnosis of occupational dermatitis is more likely to be correct than if his patient is the only one of a group who is affected.

If the patient has previously had similar attacks when working with the same chemicals, the chances that he has an occupational dermatitis are increased. If the history shows that dermatitis occurs whenever the worker is at work, improves or disappears when he is away from work for a few

days, and recurs soon after he returns to work, then there is established a definite cause and effect relationship between the occupation and the dermatitis.

2. Site of the Eruption. The site of the eruption is important, because occupational dermatitis begins on the parts most exposed to the irritant: the fingers, hands, and forearms if the substance is handled; the face and neck where the industrial operation gives rise to dust, vapors, and fumes; and the covered parts of the body when the irritant penetrates the clothing. Especially is this so if work clothes and underclothes are not changed daily and if shower baths are not taken before leaving the work place. Portions of the body subject to friction are often sites of occupational dermatitis; the wrist, the belt line, the ankle at the shoe top, the neck at the collar line—all are sites where irritants may be rubbed into the skin. Sometimes an irritant not strong enough to cause dermatitis on the fingers, may be carried by the hands to the tender skin under the eyes and cause dermatitis there. Sometimes an occupational dermatitis may become generalized. Especially does this occur in workers who have a high degree of sensitivity and who are entirely exposed to irritant penetrating dusts, fumes, or vapors, or who work for long periods without changing work clothes.

3. Appearance of Lesions. This is not characteristic except in a few classes of occupational irritants. Paronychia [7] and onycholysis [8] are common occupational lesions among fruit and vegetable canners, dish washers, soda fountain attendants, scrub-women, and housewives. Acne-like lesions,[9] folliculitis,[10] and boils on the arms and legs are characteristic occupational lesions among workers exposed to cutting oils, crude petroleum, heavy coal tar distillates, and certain viscous and wax-like chlorinated hydrocarbons. Hydroscopic chemicals, such as sugar, salt, and lime and the volatile solvents, will in time cause the skin to become defatted and fissured.

4. Differential Diagnosis. The common non-occupational diseases of the skin, such as seborrheic dermatitis,[11] pityriasis rosea,[12] erythema multiforme,[13] neurodermatitis,[14] fungus infections [15] and their allergic manifesta-

[7] Paronychia—infection, usually with a pus producing organism, around the edge of a nail.

[8] Onycholysis—partial separation of a nail from its nail bed.

[9] Acne—an inflammatory disease of the sebaceous (oil) glands of the skin, especially common on the face, back, and chest and characterized by black heads, and "pimples."

[10] Folliculitis—inflammation of the structure around a hair root.

[11] Seborrheic dermatitis—a skin disease, subacute or chronic, affecting usually the scalp, area around the nose, and middle of the chest and back, and characterized by greasy scales.

[12] Pityriasis rosea—a self limited skin disease affecting the skin of the trunk especially, and the extremities to a less extent, characterized by oval, reddish, scaly "spots" that vary from ¼ to ½ inch in diameter.

[13] Erythema multiforme—a skin disease with a number of causes and characterized by various types of lesions varying from reddish to purple "spots" to blisters and occurring especially on the extremities.

[14] Neurodermatitis—a chronic skin disease of unknown origin characterized by itching, redness, and thickening with exaggeration of the normal furrows of the skin.

[15] Fungus infections—a skin infection with a pathogenic fungus, a well known example being "athlete's foot."

tions,[16] and contact dermatitis [17] caused by irritants encountered outside of the work shop, must be differentiated from occupational dermatitis. It is true that the presence of these diseases does not exclude the presence of an occupational dermatitis. In fact, an occupational dermatitis may more easily occur on a skin which is already damaged by another skin disease.

The fungus infections and their allergic manifestations, the so-called phytids, cause the most controversies before compensation boards. The defendants often contend that the skin disease for which the worker claims compensation is not occupational, but is of fungus origin. Especially is this the defense when the worker is found to have a definite fungus infection of the feet, groin, or other parts of the body not exposed to the occupational irritant. In these cases the defendant claims that the skin lesions on the exposed parts are also fungus infections or the result of allergic manifestations to the fungus infections (dermatophytids). The various tests with tricophytin [18] are of little value in making a differential diagnosis because they are nearly always positive as most persons have had these infections. They are of value only in the rare cases in which the tests are negative because then they tend to show that the claimant has had no fungus infection. But even if it is shown that the claimant has an active fungus infection or phytid, this does not rule out the possibility that he may also have an occupational dermatitis. In fact, it is held by some authorities that an allergy to fungus infections predisposes to allergic occupational dermatitis. I cannot subscribe to this theory. Although I agree that a skin damaged by the lesions of a fungus infection is more easily irritated by an external irritant than the normal skin, and may even grant that such a damaged skin may be more easily entered and sensitized by a sensitizing substance, I cannot conceive that sensitivity to a specific substance predisposes to sensitivity to an entirely different substance. If this were so, our accepted theories of specific sensitivities and specific immunities on which rests much of our therapy would have to be entirely revised. Those of us who are allergic to some substance, and many of us are, would all tend to become allergic to many substances, and those of us immunized to one disease, such as typhoid or smallpox, would tend to become immune to all diseases. The facts are exactly the opposite. Most of us do not take on new allergies, but tend to lose the ones we have. Children affected with the so-called atopic eczemas [19] tend to lose them as they grow older. Grown ups sensitive to ragweed do not as a rule become sensitive to other plants. Those immunized against

[16] Allergic manifestations of fungus infections (dermatophytid)—a dermatitis usually occurring on the hands, and especially the palms, characterized by deepseated blisters, redness, and occasionally itching. It is an allergic manifestation of a focus of fungus infection at another site, i.e. the feet, groin, etc.

[17] Contact dermatitis—a dermatitis resulting from an irritant substance coming in contact with the skin.

[18] Tricophytin—an extract of a certain pathogenic fungus or fungi used for doing skin tests the results of which are useful in determining whether the individual is or has been infected with certain fungi.

[19] Atopic eczemas—dermatitis characterized by redness, and tiny blisters, and usually itching. It is caused by a substance acting from within the body, such as a certain food.

smallpox must also be immunized separately against typhoid, yellow fever, typhus fever, plague, or whatever other disease they are to be protected against.

It is also difficult to differentiate occupational from non-occupational contact dermatitis. The lesions and sites are similar and only a careful elicitation and consideration of all the facts can lead to a correct understanding of the cause. In these cases and in differentiating fungus infections, the patch test is of great value.

The patch test is based on the theory that if a dermatitis is caused by hypersensitivity to a certain substance, such substance when applied to an area of unaffected skin of the susceptible individual and left on for a period of time will cause an inflammation at the spot where it touches the skin. In doing patch tests, it is important to know what concentrations of certain chemicals can come in contact with the normal skin for a stated period of time without causing an inflammation or reaction. It is also important that no primary irritants, such as strong acids or alkalis, be used in the patch test, as they will burn any skin. The portion of the body on which a patch test is to be performed is also of importance because it has been found that the different portions may vary in sensitivity to certain chemicals. For instance, the tough horny skin on the hand is less susceptible to irritants than the more tender skin on the inner surface of the forearm. For this reason, patch tests performed on uninflamed skin adjacent to the eruption are more likely to give reactions of diagnostic significance than when performed on more distant areas.

If the worker is handling known irritants and his fellow workers are also affected, the cause is obvious and the patch test is unnecessary, but if he is the only one of the group who is affected, then he should be tested with the materials with which he comes in contact in the course of his occupation. If he is patch tested with only one substance, a control patch should be also used. If the subject is tested with more than one substance any negative reaction from one of these substances serves as a control.[20] It is also desirable to use as a control one of the workers who has no dermatitis.

In patching with solids, best results are obtained by moistening them, preferably with perspiration obtained from the armpit of the patient. Sometimes it may be necessary, in order to obtain a reaction from a patch test, to use perspirations of differing hydrogen ion concentrations. The results of patch tests must be correlated with the worker's particular occupation, the history of the dermatitis, and the site and morphology of the lesion, in order to arrive at a correct etiologic diagnosis.

Patch tests are only a link in the chain of evidence on which a diagnosis of industrial dermatitis is made. A positive reaction shows only that the portion of the skin on which the patch was applied was at that time sensitive

[20] Control—a test which is identical in all respects to an experimental test except for the omission of the substance which is being tested, or using the identical test on another person who is then the "control."

to the particular substance. In order to state that this substance was the cause of the occupational dermatitis, we must be sure that the patient was exposed to the substance in the course of his work and presuppose that the patient's skin was also sensitive at the time of industrial exposure.

When negative results are obtained from patch tests with the materials met with in the course of the patient's occupation, we must not conclude too hastily that the dermatitis is not of industrial origin, for one or more of the following reasons:

1. The skin area over which the patch was placed may not be hypersensitive, whereas the area covered by the eruption may be hypersensitive.
2. If the eruption has disappeared the patient may no longer be sensitive when the patch test is performed but may have been sensitive at the time he had the eruption and when he was industrially exposed.
3. A negative reaction may be due to the fact that the patch test never accurately reproduces actual working conditions, such as friction, maceration, heat, cold, and sunlight, which may be additional factors adding to the irritating effect of the substance to which the patient is exposed.
4. It may be that the concentration and amount of the chemicals applied as a patch test may not be as great as they actually were during industrial exposure.
5. Finally, the actual industrial irritant may not have been discovered and applied as a patch test.

When negative reactions are obtained from patch tests with substances encountered in the work room and the dermatitis which the worker has resembles a contact dermatitis, an effort must be made to perform patch tests with materials met with in the patient's home, which may be the cause of dermatitis. Certain plants, or perhaps paints, or even new furniture are examples of such materials. Tests of this kind will in some cases show that the patient is sensitive to materials met with outside of industry, and is not sensitive to the materials with which he comes in contact in his place of employment.

The technic of performing patch tests is important. When testing for hypersensitivity to primary irritants, such dilutions must be used in the tests as are known not to irritate the normal skin.[5]

The ordinary procedure in performing a patch test is as follows: A sample of the material to be tested is first placed on a suitable skin site—the inner surface of the arm or forearm, or the back usually being chosen. If the material to be tested is a solid it may be used as such, or a piece of gauze about four ply thick and a quarter to a half inch square may be moistened with water or perspiration and impregnated with the material. In the case of liquids or solutions of the substance to be tested, the gauze square is dipped in the fluid and applied to the skin. Again it is emphasized that only

those materials, or proper dilutions of substances in solution, should be used that are known not to affect the normal skin. Over the patch test substance, or the gauze patch impregnated with this substance, is placed a piece of insulating material about an inch square, and a two inch square of adhesive is placed over all to hold the patch in place. The insulating material inserted between the chemical and the adhesive plaster should be a non-irritant substance, such as unvarnished cellulose or, better still, a thin sheet of mica may be used. The resin on waterproof cellophane itself may be an irritant as may be some of the compounds in dental rubber. The adhesive plaster used to hold the patch in place often causes an erythema [21] of the skin. The patch test is allowed to remain on the skin for 24 to 48 hours before removal and the site is observed for several days thereafter for determination of the result.

Patch tests are considered negative (—) when no reaction occurs at the site in contact with the substance being tested. A transient erythema that does not persist at least twenty-four hours is also considered negative. Positive patch tests are usually graded from one plus (1 +) to four plus (4 +) depending on the severity of the reaction.

At the time the patches are removed there may be no reaction present, but some time later, a few hours to a few days, a delayed reaction may develop at the site of the patch. We should regard delayed reactions as denoting a lesser degree of hypersensitivity than undelayed reactions provided the concentration and amount of the patch testing substance is the same and the area covered by the patch is the same.

Patch tests properly performed and evaluated can be of great help in the diagnosis of industrial dermatitis, but if improperly performed and evaluated, they may lead to confusing and unjust conclusions.

Allergy as a Cause of Occupational Dermatitis. Allergy is a word to denote an altered reactivity in human beings or in animals caused by a first contact with a substance and manifested after an interval of time (period of incubation) upon second contact with the original or identical substance. A standard medical dictionary, however, defines it as "A condition of unusual or exaggerated specific susceptibility to a substance which is harmless in similar amounts for the majority of members of the same species." [6] This definition differs radically from the first by the fact that it does not presuppose that sensitization is caused by the first contact and that it develops only after a period of incubation has elapsed, and only after another contact has occurred.

The "allergy" as defined by the dictionary may be caused by a visible or demonstrable breach in the defense mechanism of the skin, such as abrasions, disease of the skin, thinning of the epithelium, loss of the normal fluids of the skin, etc., which enable an irritant to enter it easily. But the conception of the first definition implies that changes, caused by the first contact,

[21] Erythema—redness of the skin due to congestion of blood in the skin capillaries.

so condition the skin, even though no change is demonstrable, that after a period of incubation has elapsed, second contact with the substance causes a dermatitis. If the first definition is to be accepted, then allergy causes less than 20 per cent of all occupational dermatitis.[7]

Allergy should not be a bar to compensation for occupational dermatitis. Allergic occupational dermatitis usually develops in new workers about five days to three weeks after beginning work. In most cases, if the worker is able to keep on working, the dermatitis clears up—the worker becomes "hardened." Only a small percentage of such cases do not develop this "hardening." The worker should be removed from the job if the dermatitis does not clear up after two months of treatment or if he develops recurrent attacks of dermatitis while working.

A chronic dermatitis more or less generalized occasionally occurs in a worker, usually passed middle age, the cause of which it is almost impossible to determine. Such a worker's history shows that he has worked at the same occupation for many years without any trouble and then suddenly develops a dermatitis which persists even though he stops working for a long time. An examination of his work may reveal no new chemicals or changes in process to which the dermatitis can be attributed. The claim is made that the worker has become sensitized to some substance or substances in his work and that as a result of that sensitization he has become sensitized to many other substances which are not connected with his work. Therefore, he cannot get well even though he leaves his job. There are many dermatologists and allergists who will support such a contention. But they cannot prove that the patient did not first develop a sensitivity to a substance met outside the working environment, and that the occupational sensitivity did not follow and was not secondary to the non-occupational one.

Patch tests on such persons are unsatisfactory and sometimes impractical because the patient may be feeble and the risk of a flare-up of the skin lesions cannot be taken, or there may be no normal areas of skin on which a patch test could be performed. Such a damaged skin may react to anything in the form of a patch test. If such patch tests are performed and results are positive, it may be concluded that his occupation is at least a contributing factor to the dermatitis. Even if the patch test shows negative reactions to the substances in his working environment and positive reactions to non-occupational ones, it still can be argued that this is only presumptive and not positive proof that he was not sensitive to those substances in his occupational environment at the time that he first became sensitized. This would imply that the worker originally developed a dermatitis as a result of becoming sensitized to some substance encountered in his occupation. Following this he developed a polysensitivity—that is, he also became hypersensitive to substances encountered elsewhere than in his occupational environment. Subsequently, and prior to the time of patch testing, he lost his original hypersensitivity to substances encountered at his occupation but retained his

hypersensitivity to the substances encountered away from his occupational environment. This contention should not be supported. If it is, then every allergic condition in a worker which first manifests itself after he begins to work can be reasoned to be of occupational origin. Besides, such a theory is contrary to the accepted theories of specific sensitivities and specific immunities. In fact, it is usual for new workers handling sensitizing chemicals to develop an allergic dermatitis five days to three weeks after beginning work, and for the large majority of them to get well, become "hardened" as the workers call it, and work without further trouble; they become desensitized instead of polysensitive.

But even if we should admit that one sensitivity predisposes to another and finally to polysensitivity, it would still remain debatable whether polysensitivity causing a chronic persistent allergic dermatitis in a worker is the result of an occupational sensitivity first acquired to which the non-occupational sensitivities are secondary, or vice versa.

Polyvalent sensitivities causing allergic generalized eczemas also occur among people exposed non-occupationally to sensitizers. Their causes are many and often undetermined. It is true that if such a worker shows a positive reaction to a patch test with any of the substances which he encounters in the course of his work, his occupation should be considered to be at least a contributory cause of his dermatitis; but if the patch tests with these substances are negative, or are not performed, then the occupational etiology of his dermatitis has not been established and is open to question.

Claims have been made before compensation commissions that the ordinary skin diseases of unknown etiology, such as psoriasis[22] and lichen planus,[23] are caused by the worker's occupation. The physician on the witness stand is often asked, "Well, Doctor, since the causes of this disease are not known, is it not possible that the plaintiff's occupation was the cause of it? Answer yes or no." The physician should answer "No," and then explain that if the plaintiff's occupation were one of the causes of the disease, then a large percentage of the workers employed at it would also be affected, which of course is not so.

It is possible that new lesions of psoriasis and lichen planus may appear on areas of skin which have been injured in the course of work, as is the case in injury from any cause, but the psoriatic tendency was present before the trauma. So, although new lesions which occur on areas of the skin occupationally traumatized may be said to be occupational, this cannot be said of the disease entity itself.

Occupational Cancer. It is generally recognized that tar, soot, pitch, crude petroleum, the actinic solar rays, roentgen-rays, and radium have car-

[22] Psoriasis—a common skin disease of unknown cause characterized by scaly erythematous plaques found most frequently on the knees, elbows, and on the scalp.

[23] Lichen planus—a skin disease of unknown origin occurring frequently on the extremities, characterized by elevated, flat-topped angular papules. There is usually some itching.

cinogenic properties. Workers with these substances who develop carcinoma [24] can claim that it was caused by occupational exposure, but it must be remembered that the normal incidence of cancer among human beings must also be taken into account. Occupational skin cancers have certain characteristics:

They always appear on parts exposed to the carcinogenic agent.
They are often multiple and recurrent.
They are always preceded by a precancerous lesion.
They always appear in workers who have long been exposed to the carcinogen.
They usually do not have metastases.[25]

For instance, if a worker develops a cancer on the face and it is shown that in his occupation he is exposed to the fumes of coal tar pitch, it is likely that the cancer is an occupational one. But if a similar worker develops a cancer of the lower lip and it is shown that he is a pipe smoker, the occupational origin of his tumor is, to say the least, questionable.

Workers exposed to alpha- and betanaphthylamine and benzidine in synthetic-dye plants who develop tumors of the bladder have a legitimate claim for the occupational origin of the tumors. Workers in radium mining who develop carcinoma of the lungs can also rightly claim occupational origin. Physicians and laboratory technicians who work with roentgen-ray or radium and develop carcinomata of the hands have a legitimate claim of occupational cancer. Radium can also cause cancer of the bones, especially if it is ingested. But the actinic-ray cancers on the exposed parts of workers in sunny tropical climes are not so clearly of occupational origin, because they live in that climate and are still exposed to the actinic rays when they are not at work.

The rôle of arsenic as a cause of occupational cancer is open to debate. There is no doubt that the long-continued oral ingestion of inorganic arsenic can cause palmar and plantar keratoses.[26] But to claim that the cancer appearing on the face or hands of a farmer is due to the arsenical insecticides which he may use is rather far fetched, especially when the farmer is also exposed to actinic rays. Examination, by the author, of many hundreds of workers with arsenical insecticides and other arsenic compounds has failed to show any skin cancers. The medical records of the factories in which these persons were employed also failed to show skin cancers. Reports of State compensation boards received by the author for the past 10 years fail to show any skin cancers attributed to arsenic, although there are many reported as caused by coal tar and petroleum.

[24] Carcinoma—a cancer, or malignant growth.
[25] Metastases—a malignant growth occurring in another part of the body from that of the original malignancy, having reached its new site through the transportation of cells from the original growth by lymph and/or blood vessels.
[26] Keratoses—a horny growth on the skin.

The reports of cases of occupational arsenical cancers by certain authors are open to the criticism that the etiology of the cancers was not proved but inferred. The proof usually consisted of the fact that the worker said he handled arsenic, or he was a miner of ore which may have contained arsenic. "Post hoc, ergo propter hoc." This is poor evidence.

Trauma as a Cause of Cancer. Cancer when it occurs is often attributed to faintly-remembered blows. However, blows are of common occurrence, whereas cancer at the site of trauma is extremely rare. Therefore, the burden of proof of trauma causing cancer is on the claimant. He must first show that the part was normal before the trauma; that the blow was a severe one, or very often repeated, and included the site of the tumor; that a sufficient interval elapsed between the occurrence of the injury and the appearance of the tumor; that a biopsy [27] verifies the carcinomatous nature of the tumor.

Chronic occupational irritation may be a cause of cancer.

Cancers arising in scars resulting from occupational injuries can certainly be called occupational.[8]

The Physician and the Compensation Commission. Every physician making a diagnosis of occupational dermatitis should fill out the following questionnaire in reporting his case:

SKIN CLINIC

DATE.....

NAME.....AGE.....RACE.....

TYPE OF SKIN: (DRY, MOIST) (THICK, THIN, PARCHMENT-LIKE) (DARK, LIGHT, FRECKLED)

CHAPPED.....

PREVIOUS SKIN DISEASES.....

.....

HISTORY OF ALLERGY (hay fever, asthma, plant poisoning, etc.).....

.....

NAME OF EMPLOYER.....

MANUFACTURE WHAT.....

BRIEFLY DESCRIBE WORK.....

.....

PRESENT WORK BEGAN.....PRESENT DISEASE BEGAN.....

CHEMICALS OR SUBSTANCES CONTACTED.....

.....

DESCRIBE LESIONS.....

.....

.....

.....

[27] Biopsy—examination of a piece of tissue, including microscopic examination, removed from a living subject for purposes of diagnosis.

PATCH TESTS PERFORMED

Substances	Concentrations	Time	Reactions

Dermatitis Caused By.....

.....

Diagnosis Based On.....

.....

.....

Treatment Given.....

.....

Preventives Advised.....

.....

Advised Cease Work.....How Long.....

Remarks.....

.....

.....

.....

.....

The answers to these questions will enable the commission to judge the criteria on which the diagnosis is made.

If the physician is to appear before the commission he should make himself thoroughly familiar with the occupational process at which the patient works, the health hazards involved, the occupational history of the patient, and the literature concerning the hazards of the patient's occupation. He should be familiar with all the diagnostic tests involved and should be prepared for a rigid cross examination.

The expert physician should confer with the lawyer before the trial and coach him as to what questions to ask on direct examination to best bring out the evidence in favor of his client. He should also instruct the lawyer on weak points in the case of the opposition so that he can cross examine to the best advantage the expert physician on the other side of the case.

The physician on the witness stand should answer the question as put (if his counsel does not object); but if an explanation is necessary, he may give it after answering the question. He should never hesitate to say "I don't know" when he does not know. It makes what he does say much stronger, and may keep him out of trouble.

For instance, a certain well known dermatologist testifying before the Federal Trade Commission in the case of a progressive lead hair dye which was advertised as stimulating the natural pigment-forming cells of the scalp

testified that the preparation was a dye. He was asked on cross examination "Would it dye cotton?" After hesitating he answered "Yes." Whereupon the lawyer placed some cotton in the colorless liquid hair dye, allowed it to stay in for a while, then pulled it out to show that it was not dyed. The physician was chagrined, and the incident tended to belittle the physician's qualifications as an expert. He should have answered, "I do not know. I never tried to dye cotton with it." Fortunately the author was present and knew that lead salts could be made to dye cotton if the cotton was first treated with a sulphur compound so that it contained sulphur, as does the hair. He asked the lawyer (for the Government) to put him on the stand and ask the same question, to which the same answer was given, and a piece of white gauze was first dipped into a solution of sodium thiosulphate, allowed to dry, then immersed in the colorless lead hair dye solution. After a few minutes, when lead sulphide was formed on the gauze, it was seen to turn dark.

The physician should also confer with counsel so that he may know how to bring out facts showing that the medical qualifications, experience, ethics and standing of an unscrupulous expert are not of the best.

Dermatitis from Wearing Apparel and Cosmetics. Dermatitis allegedly caused by wearing apparel, cosmetics, and jewelry is frequently reported; but when we consider that the entire population is constantly exposed to them, we realize that the percentage of the population affected is almost negligible.

The records of the casualty insurance carriers for 1941 [9] show that only 78 claims for dermatitis from wearing apparel and cosmetics were reported to them. The table below classifies these cases according to cause:

Wearing Apparel		Cosmetics	
Hat bands	12	Hair preparations	16
Pajamas	9	Soaps	6
Underwear, women's	6	Face creams	6
Hose, women's	5	Nail polish	2
Dresses, women's	3	Mascara	1
Shorts, men's	3	Face powder	1
Wrist watch straps	3	Deodorant	1
Clothes, men's	2	Hand lotion	1
Dress shields	1		
Total	44	Total	34

The National Retail Dry Goods Association sent a questionnaire to its members asking the number of claims they had for dermatitis from January 1, 1940 to July 1, 1941.[9] Fifty stores reported that they had no complaints, 60 stores reported 656 cases, classified as follows:

Wearing apparel, women	425
Wearing apparel, men	61
Cosmetics	61
Miscellaneous	9
Not accounted for	100
Total	656

One hundred and thirty-three stores reported that they had complaints, but did not give the number of them, nor the year in which they were made. They were classified as follows:

Number of stores reporting complaints from wearing apparel and cosmetics—

From dresses	14	From cotton	5
From rayon	13	From pajamas	5
From furs	11	From jewelry	4
From corsets	10	From underwear, women's	3
From hosiery	10	From garters	3
From wool	9	From miscellaneous	21
From underwear, men's	8	From cosmetics	10
From coats	7		
		Total	133

The stores reporting to the National Retail Drygoods Association reported only 17 of these cases to the insurance carriers so that there is but little duplication in all of these figures. Therefore, it is safe to say that there are less than 1,000 cases of dermatitis per year allegedly caused by wearing apparel and cosmetics among 130 million people. This is one case per 130,000 and even less, for when we examine the reports we find that only a small percentage of the claims were proved, if judged by accepted medical criteria.

Only a few of these cases went to trial. Most of them were either dropped or were settled by crediting the merchandise, by paying the medical bills, by small cash settlements, or by combinations of these.

Allergenic substances are the principal causes of dermatitis from wearing apparel, and there will always be some people who are allergic to substances which are harmless to by far the large majority.

Hair wave preparations, hair dyes, medicated soaps, skin creams, and nail polish are the principal cosmetics reported as causes of dermatitis. The hair wave preparations are strongly alkaline and are classed as primary irritants, but the hair dyes, soaps, creams, and nail polish are only sensitizers.

In looking over the claims we note that the products complained of were made by a few manufacturers. For instance, all the hat band complaints were against one large hat manufacturer. The wrist-watch strap complaints were all against one product. The large majority of the hosiery and pajama complaints could be traced to one finish. Most of the hair-preparation complaints were against two or three cosmetic trade names, and all the nail-polish complaints were against one maker of nail polish. Therefore, it must be presumed that the manufacturers used some unusual or new chemicals in their products, or that they were careless in their manufacturing processes. Furthermore, it must be presumed that they did not perform approved toxicity tests on the products before selling them to the public.

It seems likely that if the plaintiffs in these cases had known that many others were being affected by the same products, they could have made a strong case against the manufacturers.

Except for the occasional outbreaks of dermatitis from new and untested products, the majority of the claims for dermatitis from wearing apparel and

cosmetics are either due to the constitutional idiosyncrasy of the plaintiff, or they are false.

It is not difficult to determine the cause of a dermatitis due to wearing apparel or cosmetics. Such an eruption begins at the site of contact with the irritant, usually five days or more after the first contact, provided there is at least a second contact at the lapse of this period, or if the contact has been continuous or intermittent. This is the period of incubation for the establishment of sensitivity. The eruption may occur sooner if the article of wear or the cosmetic contains a primary skin irritant, or if the patient has previously been sensitive to the sensitizer in the garment or the cosmetic.

The eruption is usually confined to the sites touched by the irritant. Only in exceptional cases is there a generalized eruption. The eruption disappears or improves when the offending garment or the cosmetic is not used, and becomes worse or returns every time it is again used.

It is possible to find the actual chemical in the garment or cosmetic which is the cause of the dermatitis. Methods for determining this have been devised.[8, 10] It may be a long and difficult process in an individual case, and not of sufficient importance to warrant spending the time, but every physician making a diagnosis of dermatitis from a fabric or cosmetic in the case of a patient who intends to claim damages should be at least required to fill out the following form. If he does this properly, he will make a favorable impression on the witness stand and escape much embarrassment on cross examination.

1. When did patient buy the garment or cosmetic?
2. From what firm?
3. Date when it was first worn or used.
4. Date when eruption was first noticed.
5. What parts of body were first affected?
6. Give order in which eruption spread.
7. Describe entire extent of eruption.
8. What previous skin diseases did the patient have?
9. Has the patient a history of skin or mucous membrane allergy?
10. What drugs, if any, does the patient use?
11. What laxatives?
12. What sedatives?
13. Were any drugs taken before present eruption?
14. Was poison ivy or other irritant plant contacted before eruption?
15. Is the eruption still present?
16. When was use of garment or cosmetic discontinued?
17. How long after this did the eruption persist?
18. Were patch tests performed?
19. If so, with what substances. Describe tests in detail and give results.
20. If no patch tests were done, give reasons for not doing them.
21. Has the actual chemical causing the dermatitis been found?

22. Describe how this was accomplished.
23. Summarize the facts on which you base your diagnosis.
24. What treatment was given?
25. Give prognosis.

Before testifying in court the expert must make himself thoroughly familiar with all the aspects of the case and with the medical literature pertaining to such cases. The counsel and the expert dermatologist, before appearing in court on claim cases, should discuss the merits of the case so that they can agree on the questions which, on direct examination, will best bring out the facts to prove their claims and to refute the claims of their opponents.

Some Points the Plaintiff Should Try to Show. The plaintiff should try to show—

1. That there were many other users similarly affected.
2. That the material causing the dermatitis was made with chemicals which are notorious sensitizers.
3. That the materials causing the dermatitis contained new chemicals or chemicals not previously used in such materials.
4. That the manufacturer did not properly ascertain the skin irritating properties of the product before offering it for sale.
5. That the particular garment was not properly processed according to the accepted custom of the trade, i.e., "dirty fur"; finish not properly applied, dye bled, etc.
6. Patch tests properly performed on patient and controls show that garment or cosmetic is a primary irritant or sensitizer, and was the cause of the dermatitis.
7. That the patient was not sensitive before the substance was used.
8. That using the substance was the cause of the sensitization.
9. That using the material caused the eruption to appear or get worse, and vice versa.
10. That the plaintiff was not allergic to any other substance which may have caused the dermatitis.

Some Points the Defendant Should Try to Show:

1. That although there were thousands of users of similar substances, the plaintiff was the only one affected.
2. That the substance contained no primary irritants nor strong sensitizers.
3. That the substance contained no new chemicals or chemicals not previously used in such materials.
4. That the substance was made in the usual manner in which such substances are made and approved by the trade.
5. That the new chemicals used, if any, were properly tested by recognized authorities and found to be no more irritating than chemicals commonly used for the same purpose.

6. That the finished product was properly tested by recognized authorities on a sufficient number of people and found to be no more harmful than other similar substances before it was placed on sale.
7. That the particular garment or cosmetic used by the plaintiff did not differ from all the others which had been sold and which caused no trouble.
8. That the dermatitis of the claimant did not have a cause and effect relation with using the substance; i.e., that it did not begin where the substance touched the skin; that it appeared, disappeared, got worse, improved, regardless of whether the substance was or was not used.
9. That the patch tests were negative; or if positive, were not properly performed or evaluated; i.e., patch tests made with extract of substance; permitted to remain on too long; patch tests were more severe than actual use; no control patches nor control persons were used.
10. That the disease was not a contact dermatitis, but something else.
11. That the plaintiff is allergic to other substances which may have caused the dermatitis.

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CIRCULATORY DEFICIENCY IN THE EXTREMITIES IN RELATION TO MEDICO-LEGAL PROBLEMS: ARTERIOSCLEROTIC DEFICIENCY (INCLUDING DIABETES); THROMBOANGIITIS OBLITERANS, OR BUERGER'S DISEASE *

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INTRODUCTION

THE diseases to be described are able to reach their full development in the absence of injury, and often do so. As a rule, injury is an aggravating factor, hastening the development of the disorder—precipitating it in some instances—bringing out a latent condition. Occasionally, however, as in the case of thrombosis of a blood vessel, a blow, fall or strain may appear in any one instance to be the sole recognizable cause of the disease. From a medical point of view, the distinction between an aggravation and a basic cause is significant. From the medico-legal standpoint, it is less so. In workmen's compensation cases, for example, the insurer is equally liable, whether a circulatory disorder is aggravated or the individual breaks a bone. As far as possible, in the following account of various circulatory diseases, it will be pointed out how injury may affect them and under what circumstances it is most likely to do so. But medical conceptions are far from fixed and, very often, authoritative pronouncements are not available.

CIRCULATORY DEFICIENCY IN THE EXTREMITIES

ARTERIOSCLEROTIC ARTERIAL DEFICIENCY

The two varieties of chronic circulatory deficiency, due respectively to arteriosclerosis (hardening of the arteries) and thromboangiitis obliterans (Buerger's disease), have much in common. Arteriosclerosis occurs in the elderly as a result of the wear and tear of life. Thromboangiitis obliterans, which is of unknown origin, attacks a far younger group. Both diseases, however, cause a serious deficiency in the supply of arterial blood in the affected limbs. The upper extremities, though actually subject to both diseases, are rarely so changed as to offer a clinical or medico-legal problem. The lower limbs are the ones seriously affected, and the descriptions which follow concern only them. Much of what is said, under the heading of Arteriosclerotic Arterial Deficiency, of the nature of a defective arterial circulation, applies to Buerger's disease as well, for example, the tests for arterial deficiency and the reaction to injury. To avoid repetition, a reasonably complete account of these subjects is given under Arteriosclerotic

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Arterial Deficiency, and allusion is made to this in the description of thromboangiitis obliterans. Thus the account of the two diseases should be read together.

Pathology. Both large and medium sized arteries are hardened by arteriosclerosis. Calcium salts are deposited in their walls, making them still more inelastic and causing them to cast a shadow in the roentgenogram. They are narrowed in a patchy manner by the formation of mural thrombi within them. This erratic narrowing, by restricting the arterial supply of blood, leads to ill-nourishment of the tissue which they serve, affecting especially the toes. The ill-nourishment is seldom equally distributed as between two limbs and even as between toes, muscles and skin. It causes shrinkage of the tissues, that is, of the skin, fat, and muscles, tending to make them inelastic and even fibrous. They cease to react in a normal way to injury and infection, but they need exhibit no obvious change in appearance. Such changes as are present are usually irreversible, though their further development is often checked by the establishment of alternate routes for the blood stream, the opening up of a "collateral" circulation on a large or small scale.

When a more complete arterial deficiency is added by a thrombosis * which actually obstructs one or several vessels, then more or less rapidly death of some terminal part of a limb occurs—toes, foot, even lower leg—a change known as necrosis or gangrene. Necrotic parts are especially likely to be the scene of infection which often spreads to nearby tissues. Under favorable circumstances the gangrenous part is gradually isolated; a line of demarcation separates it from the adjacent living tissue and, after weeks or even months, it is finally cast off. Healing may then occur spontaneously.

Symptoms. Premonitory symptoms, if any, are coldness and pallor of the feet and lower legs, moderate atrophy (shrinkage) of the soft parts, and a peculiar lameness on walking. Known as "intermittent claudication" or "intermittent limp," this lameness, in the form of a cramp-like pain, sets in regularly when the individual has covered a certain distance at a certain pace. It is relieved in a few minutes by rest but returns upon the same

* The term, thrombosis, applies to a biological process which may occur within both arteries and veins. Certain elements (platelets) of the blood, becoming adherent to the wall of the vessel, are agglutinated into a framework in which the red and white cells and newly formed fibrin become entangled. The resulting firm mass grows by a process of secondary coagulation and, if it plugs the vessel, may spread along it for a considerable distance, becoming softer and more clot-like as it grows. Scientifically speaking thrombosis thus differs from coagulation or clotting, which only occurs within blood vessels after death, or outside the body, or as a process altogether secondary to thrombosis (as just explained). To laymen and indeed to many medical men, thrombosis and clotting mean the same thing.

A thrombus may be "mural," merely narrowing without obstructing a blood vessel, or it may obstruct it for a considerable distance, growing on, as a rule, until it meets the vigorous current of an entering branch, when it is likely to become organized (invaded by fibrous tissue).

The cause of thrombosis is presumably a combination of circumstances among which injury, disease of the vessel wall and slowing of the blood stream are especially important. So far as the arteries are concerned, arteriosclerosis decidedly exposes them to thrombosis (and, as will presently be seen, thromboangiitis obliterans does also). Hence the familiar narrowing by mural thrombi and the occasional plugging of arteriosclerotic vessels.

amount of exercise. Evidently it is related to a deficient blood supply of the muscles, perhaps to an unnatural accumulation of waste products.

A more advanced stage is marked by a change toward a deep red or bluish-red color of the toes on dependency, by spontaneous pain in the discolored parts, especially on elevation to the horizontal or higher, and by the appearance of sores or actually gangrenous (necrotic) areas beside the toenails, on the tips of the toes or over a bony prominence such as the great toe-joint. This advance in the disease is usually, though not invariably,

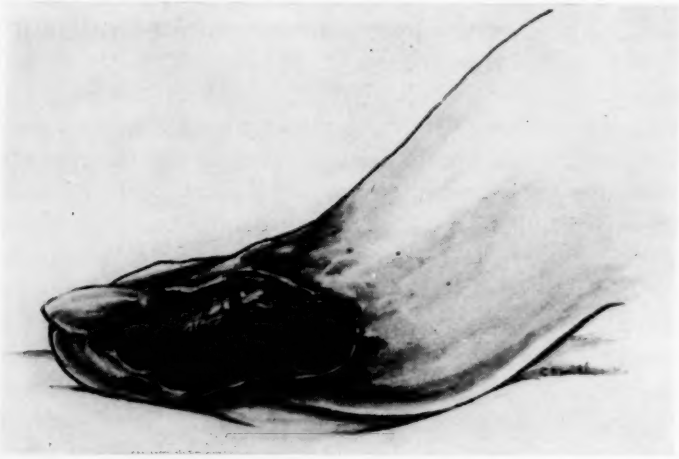

FIG. 1. Arteriosclerotic gangrene—dry, mummifying type. The gangrenous area lies on the mesial surface of the right great toe. Such a state might be present in any arteriosclerotic limb, whether or not diabetes was a factor.

irreversible. Unless favorably influenced by treatment, it is the precursor of a serious gangrene.

In diabetics the same events occur, but at a slightly earlier age (since diabetes brings on arteriosclerosis), and, in addition, small joints often become infected and small bones necrotic to a degree that the deficiency in the circulation does not seem to warrant. These infected or necrotic bones or joints, without superficial gangrene, are usually painless. Resistance to infection or injury is even feebler than in uncomplicated arteriosclerosis.

A very advanced stage is marked by gangrene of toes and feet, by infection spreading into joints and upward by way of the lymphatics * (lymph-

* The lymphatics are very fine, delicate vessels which collect the tissue fluid all over the body and empty it into the great vein (vena cava) just before it enters the heart. The lymphatics of each limb pass through a group of lymph nodes, or glands, which act as filters and, by the activity of their abundant cells, free the lymph from bacteria or other noxious material carried in it. Thus, the lymphatics have an important defensive function in freeing the tissues of organisms hostile to the body. But in carrying out the vital function, the lymphatics themselves often become inflamed, a condition betrayed by red streaks visible in the skin and leading from the infected focus in the toes or foot toward the root of the limb. Such inflammation is called lymphangitis and the secondary inflammation of the lymph nodes is called lymphadenitis. Lymphangitis is always a danger signal, indicating that infection is out of local control in the region where it has started. If the lymph nodes fail to put up a successful defense, bacteria will enter the general circulation.

angitis), by way of the subcutaneous tissues (cellulitis) and along the tendons and muscles. Such states, unless checked by amputation, are often fatal. A very sudden arterial thrombosis, closing a large vessel, may cause a rapid, extensive gangrene with prostration and even death.

The course of arteriosclerotic arterial deficiency is usually slow. In the absence of injury, of infection and of serious exposure to cold, a mild arterial deficiency is compatible with restricted or even relatively normal activity for many years. An individual may be unaware of any disorder, though subject to the bad effects of any of these accidents. He or she would be most apt to notice cold feet, lessened vigor of locomotion (or even intermittent claudication) and pallor with reduced size of the legs.

Diagnosis. When invoked as a cause of a circulatory disorder, a diagnosis of arteriosclerosis should be looked upon with doubt if made upon individuals under 60 years of age, though undoubtedly the disease occasionally occurs at an earlier age, and especially, as already explained, in diabetics. There is no definite clinical picture of arteriosclerosis per se. The hardening and narrowing of the arteries certainly restrict the blood supply of the limbs, which require at moments of active exercise a greatly increased supply of all the materials carried to them in the blood. Even these vessels however, are usually able to care for the needs of parts not in very active use. Thus, until the disease is serious enough to interfere with the nutrition of resting limbs it need cause no signs. In other words, the disorder caused by arteriosclerosis is at first functional and only in its more advanced stages destructive. The blood stream, restricted in certain areas, is often supplemented, even fully restored, through small vessels opened up under the "stimulus of necessity," a "collateral" circulation.

The tests detailed below are especially helpful in determining the state of the circulation in the lower limbs. By their aid and by the light of the symptoms and physical signs, an authoritative diagnosis should be made.

Tests for Arterial Deficiency. To prove that an arterial deficiency exists, it is not enough that the individual should be aged, or even that his palpable arteries, such as those of his wrists and ankles, should feel hard, that is, arteriosclerotic, to the touch.

The Roentgen-Ray. If a deficiency is known to exist, the presence of calcification (bony change) in the arteries, as shown in a roentgenogram, is evidence of arteriosclerosis as opposed to any other sort of arterial disease. Calcification in the roentgenogram, however, in the absence of the signs of early or advanced arteriosclerotic disease already described, is not proof of clinical arterial deficiency, though it suggests that such may be present or may readily occur. It suggests, in fact, a latent, not active disease. Moreover, calcification in the vessels of one part is no proof that a similar state will be found in another, though it is of course suggestive. For that reason, courts should require, and counsel seek, roentgenograms of the region of injury involved in the parts under litigation.

Color Changes. The normal color of the fingers and toes is some shade of pink, varying from a very pale tint almost to red. The shade is influenced by the state of the surrounding temperature, for the finer vessels of the feet and hands respond to cooling by constriction (causing pallor and conserving heat) and to warming by dilatation (reddening the skin and dissipating heat).

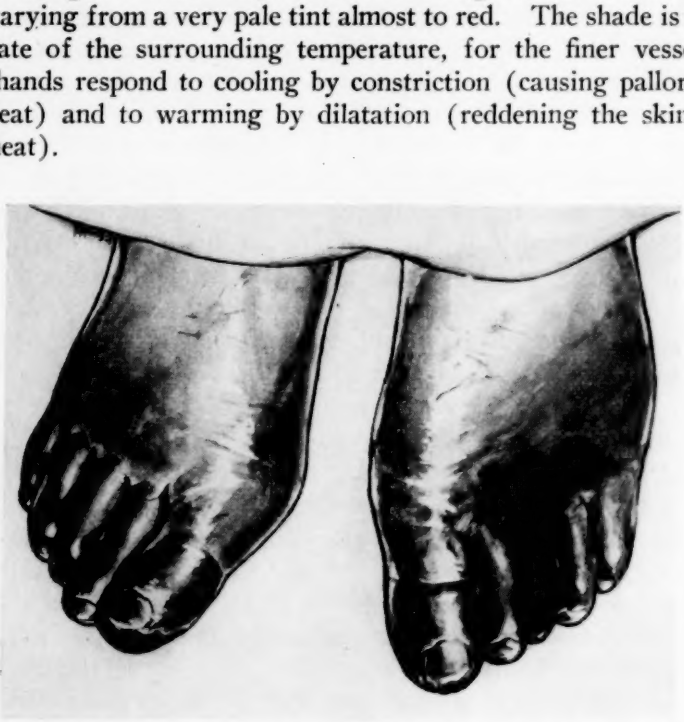

FIG. 2. Moderately advanced thromboangiitis obliterans. Dark color of the skin indicates deep redness. Black skin indicates gangrene, as of a toe. There is swelling (edema) of the forefoot, as well as of the toes. Such feet would show no pulsating arteries.

At the rather neutral, standard temperature of 70° to 75° F., the extremities should preserve at least a faint pinkness, though the temperature of the skin will become, not that of the body (98.6° F.) but nearly that of the air. In these surroundings it will feel objectively, to the examiner's touch, neither hot nor cold. As against this background, the following color changes give sufficient evidence as to the state of the circulation.

1. A dead-white, cold extremity is one in which the arterial circulation has, at least for the moment, become so restricted that it may be said to have ceased.
2. A blue, cold extremity is one in which the circulation is greatly restricted and probably slowed.
3. A red, cold extremity is one, like the preceding, in which the circulation is greatly restricted and slowed, and differs from the blue, cold extremity only in that the blood has not given up its oxygen (thereby failing to make the usual change from arterial to venous blood).
4. A red, hot extremity is the seat of inflammation. Even a deficient circulation permits *some* warming from this cause.

Simple Clinical Tests: Elevation and Depression. The color of the feet at room temperature being known, the legs are elevated by the examiner to an angle of about 30° with the horizon for a period of two minutes. If the toes retain any pinkness, the arterial circulation is at least fair. Retention of most of the normal pinkness means a normal circulation. The state of the two feet may be compared.* While the feet are elevated the shade of pinkness may be studied by compression of the tip of a great toe. The white compression-spot makes a contrast with the surrounding skin and should normally regain its color in several seconds.

On lowering the legs the time required for pink flushing of the feet and toes is normally five to ten seconds. A flushing time of 20 to 30 seconds is very slow, indicating a much restricted and slowed arterial flow. If a slow flushing is followed by a deep red or bluish-red color in the toes while they are allowed to remain dependent, this indicates again a very poor circulation.

The Pulses of the Feet. Palpable pulsations in the arteries of the feet are evidence of a good arterial circulation. Various degrees of feeble pulsations in any one vessel are significant. There being two palpable pulsating arteries in each normal foot, i.e., the dorsalis pedis upon the instep; and the posterior tibial below the inner ankle bone, absence or feebleness of one arterial pulse is important unless the pulse in the second vessel is exceptionally strong (anatomic anomaly of no significance). In general, the state of the pulses corresponds remarkably well with the other tests just described.

When color and temperature changes indicate a deficient arterial circulation, it is rare to find any but absent or feeble pulsations in the arteries of the feet in question.

On rare occasions, absence of pulsations will be noted in the presence of reasonably normal color tests. Such a finding indicates that a collateral circulation by way of very fine vessels has replaced the normal flow through the usual large pulsating arteries. This is far more often seen in thromboangiitis obliterans (see below) than in arteriosclerosis.

The Relation Between Arteriosclerotic Arterial Deficiency and External Violence

Since arteriosclerosis is a process of slow development associated with advanced age, it is certainly not caused by injury but rather by the natural wear and tear of life. The effect of violence, therefore, is to aggravate the disease, and the background for this aggravation is the narrowing of the large and small arteries (arterioles) and the slowing of the circulation. An injury works harm in several ways. Generally speaking, a bruise or cut, by killing living cells, calls forth in the tissue the reaction of repair.† This

*Such comparison should be required by the court when the litigant alleges that a single foot or leg has had its circulation impaired as a result of injury. If the uninjured member shows precisely the same circulatory impairment, this speaks for disease as the sole cause, and against traumatic causation of impaired circulation in the one leg.

†The cause of this reaction is not settled. Possibly a specific chemical substance is released by the injured cells.

reaction is marked by an outpouring of blood and by the collection in the bruise, cut or lacerated part, of what is known as an exudate (serum, blood cells, fibrin). In the exudate, the process of disposal of dead and useless material goes on, in preparation for the laying down of the framework which is to replace and unite separated parts. Uncomplicated repair of tissues other than bone normally requires eight to 12 days. Its extent is, of course, related to the severity of injury and its success depends upon an active circulation and freedom from infection. Blood must be carried in and worn-out material carried off by capillary * blood vessels hurriedly formed in great numbers to meet the emergency. By contrast with the normal, the arteriosclerotic part has narrow, inelastic blood vessels carrying a restricted volume of blood at a slow pace. Injury, then, is followed by failure of repair, or, if not by complete failure, by a process so slow as to be nearly useless. In fact, the feeble circulation, barely adequate to meet the requirements of everyday life, is called upon for excessive activity to which it cannot possibly respond, and injured tissue suffers and even dies.

Another adverse effect of injury is related to the choking of the local blood vessels by such exudate as is present, an accumulation of this material causing the familiar swelling of any bruised part. Pressure within the injured tissues against all the blood vessels—both the arteries carrying blood to the region of injury and the veins carrying it away—acts most effectively upon the easily compressed veins. As a result, blood can still enter the part but finds difficulty in leaving it, and so swelling increases, whereby a vicious circle of swelling and circulatory deficiency is set up, contributing materially to a total circulatory failure.

Yet another bad effect of injury is related to the unhealthy state of the arterial walls. Inelastic and poorly nourished, they are so easily injured that thrombosis † occurs within them. Thus obstruction by a thrombus may cut down or altogether obstruct the blood supply of an injured part. Should this occur in a large artery, in the region of the knee, for example, an individual previously believed to be in normal health might, for the first time, exhibit signs of a mild or serious arterial deficiency.

The Evidences of Injury. The evidence that external violence has aggravated an arteriosclerotic arterial deficiency is chiefly the changed appearance of the injured part.

If a blow has been received, there will be some local swelling and an appearance of extravasated blood in the skin, that is, ecchymosis; but if the damage done by a blow is serious, the toe, toes or such part of the foot as is at and beyond the point of impact will soon turn purple and finally black. The time required for this change varies. The deep color will perhaps come first at the most distant point, probably within 24 hours, after which the black color of gangrene will often require several days to a week or more to

* These are tiny vessels having walls composed of a single layer of flattened cells. The exchange of chemical materials between the blood within the capillaries and the tissue fluids outside them is very active.

† In a previous note, the distinction between thrombosis and clotting is related.

develop. Perhaps the part will hover, as it were, between life and death. Then, after many days of an appearance of purplish discoloration and swelling, some or all of it will take on the black color of gangrene. Only the tip of a toe may die, or the skin over a bony prominence. Ultimately, the gangrenous part, unless infection sets in, will shrivel or, as it is said, mummify. Thus injury may cause the loss of a toe, several toes, or even a part of the foot.

Pain, as a rule, is brought on or increased by injury in a part already the seat of arterial deficiency. The change of color in a toe or foot to deep red, reddish blue or deep purple, that is, the change showing aggravation of the deficiency, is usually accompanied by pain. Such pain is apt to be continuous, often preventing rest and sleep. It tends to be increased by elevation of the limb and to be lessened or relieved by depression. Since elevation diminishes the arterial supply to the part, and depression, by gravity, increases it, one must believe that it is through a further cutting down of the circulation that the injury causes pain. An arteriosclerotic individual, whose foot is rather pale and cool, may have been quite comfortable until an injury causes some part of the extremity to become discolored, painful and threatened with gangrene.

All such terminal stages of the disease may, of course, occur in the absence of violence, though usually some minor accident brings them on, as for instance, too close cutting of nails, paring off a callus or corn, or the irritation of an ingrowing toenail. If a bruise, abrasion, cut or laceration has occurred, however, even if of a minor sort, it may properly be blamed provided it can directly be connected with the part in which the disease has advanced.

Evidence that the ulceration or gangrene alleged to have been caused by an injury is due to aggravation of arteriosclerosis, rests upon the advanced age of the individual, a history of early symptoms of arteriosclerotic arterial deficiency, the various tests already described, especially the appearance of calcified vessels in the roentgenogram and lack of the normal arterial pulsations in the injured (and perhaps opposite) foot. Evidence of arterial disease in the opposite leg supports the contention of a previously existing arteriosclerosis, but apparent normality of the opposite leg does not disprove the contention.

If the injury is alleged not to have been the cause of swelling, discoloration and gangrene, that is, signs of serious arteriosclerotic arterial deficiency, it would be necessary to show that the advanced state of disease actually antedated the injury. That noteworthy effects due solely to arterial deficiency should appear suddenly and spontaneously as a coincidence with the injury is beyond probability.

That arteriosclerosis did not enter into the state of disease precipitated by injury would be indicated by the individual's age (below 55 years, as a rule) and the absence of calcification in the vessels of the injured limb, as shown in the roentgenogram. The fact, however, that in an individual of

an age consistent with arteriosclerosis no previous symptoms of arteriosclerosis had existed would not bar the diagnosis of arteriosclerotic arterial disease.

One foot seldom exhibits an arterial deficiency without some sign of the disorder in the other, but differences between two extremities are very common, almost the rule. When an injury precipitates a serious situation in one foot it is, therefore, not remarkable that the second foot should show only slight signs of a defective circulation. Such variations are related to the patchy, erratic quality of the arterial narrowing in arteriosclerosis and to the vagaries of thrombus formation in the large and small arteries.

Injury of a Large Artery. It has already been indicated that thrombosis in a large artery may bring on suddenly the signs of an arteriosclerotic arterial deficiency. An injury is capable of precipitating such a situation, to which the arteriosclerotic vessel is in any case liable. A case in point would be an unusual, sudden strain or blow from a heavy object acting upon the back of the knee or some part of the calf. As a result, there might be no ecchymosis or swelling, yet the effect of the injury upon the rather stiff, inelastic artery would be to set up an occluding thrombosis within it. The individual might, immediately or in a day or two, experience intermittent claudication (limp) or the toes and foot might in addition show the purplish color and coldness of a greatly restricted arterial circulation. In either event the pulses in the foot would be absent or greatly diminished in strength as compared to the opposite leg and the roentgenogram would almost certainly show some calcification in the vessels of the limb in question.

A popliteal aneurysm * (the main artery of the leg, in passing behind the knee, is called the popliteal), the most common non-syphilitic aneurysm, will produce a clinical picture almost identical with that of a thrombosis. Although it cannot be said that injury usually causes such an aneurysm which is really a partial rupture of the artery, it is probable that active bending of the arteriosclerotic vessel predisposes to it. Moreover, once the aneurysm is formed, heavy exercise or a blow may cause increased damage to the brittle wall of the aneurysmal sac and induce thrombosis within it. Though it is true that such may occur at any time, the relation of injury to a sudden increase in the size of the sack and to cutting off of the circulation from the leg beyond, might be convincing.

Cuts and Abrasions. The rôle played by a cut or abrasion is similar to but not identical with that of a blow. Again an injury is made, calling for

*An aneurysm is a local dilatation of a large artery. It is not caused by injury. Certain aneurysms are due to syphilitic disease which weakens the arterial wall, which is then dilated by pressure of the blood stream. An injury or sudden strain may cause it to rupture, with a serious, even fatal outpouring of blood.

The popliteal variety is usually not syphilitic, nor is it due to injury, but since the artery is subject to a considerable amount of bending, it may, especially if arteriosclerotic, crack, stretch or tear. Actually, one side "blows out" perhaps, allowing blood to escape. As this occurs, the blood, which cannot escape to the surface, becomes clotted and soon a false sack is found about it, the central part being more or less liquid. Since the mass pulsates with each arterial beat, it is detectable back of the knee by the touch. The vessels into which such an aneurysm leads seldom receive a normal supply of blood, and thus a greater or less degree of arterial deficiency results.

repair which is not forthcoming. A lifeless wound is left, which remains open and which almost necessarily becomes contaminated by bacteria. The infection may remain local, and indeed the neighboring tissues may establish an inflammatory zone about the injury, a feeble defense easily broken down. In some instances, appropriate treatment may cause the wound finally to heal, but the tendency is for the wound to become the source of a slowly spreading process marked by infection and death of the tissues. Neighboring toes, joints, indeed both bony and soft parts may become gangrenous. Frequently, in spite of treatment, loss of a leg is threatened. Because diabetes decidedly lowers the resistance of the tissues to infection, its presence should be suspected when a particularly feeble response to injury and infection is observed.

Thermal Injuries: Exposure to Heat. The effect of any application of heat to a part is to increase the rate of its metabolism, that is, its local chemistry. To support this locally increased activity, blood must be supplied freely. Should the arterial circulation be deficient, the heated tissues, failing to receive fuel to support their activities, break down. This may properly be called a burn, which occurs at a temperature lower than that at which this destructive reaction normally takes place. In other words, a degree of heat which vascular tissue would easily bear, harms or destroys avascular tissue.

Cold, as is now realized, up to a certain point, is well borne by tissues having a deficient circulation. The effect of cold is to retard metabolism, to slow down chemical processes. A cooled part takes on a dead-white appearance and becomes subjectively numb. When already near to gangrene and kept at a temperature barely above the freezing point, it suffers little harm from even prolonged exposure to such surroundings. When actually frozen, it dies, that is, sloughs, in medical parlance, but actually the conditions under which cold preserves a poorly nourished part or kills it are not precisely known. Nor is it known exactly under what circumstances cold, short of freezing, excites such contractions of the blood vessels of a vascular part as to damage it seriously. Individuals with a *normal* circulation may suffer marked contractions of small arteries as a response to cold, in a very chronic or obstinate form; and treatment, intended to relax such spasms before permanent damage can be done, is important. The ill-advised application of heat even to normal tissues which have been exposed to the constrictive action of cold is nearly as harmful as such application would be to tissues having a deficient arteriosclerotic circulation.

Economic Aspects of Arteriosclerotic Arterial Deficiency. For both men and women, the early stage offers no economic hardship. The individual may not be able to walk fast or far and may require heavy foot coverings in cold weather, but long hours of standing cause no hardship.

As soon as discoloration and spontaneous pain set in—a frequent, prompt effect of injury—the individual is handicapped for any occupation requiring long hours of standing. If spontaneous pain is present, even a sedentary occupation requiring close attention may be impossible.

Ulceration and gangrene, with which pain is almost invariably associated, are totally disabling. It is difficult to conceive of any occupation, however trifling, at which the individual can work or to which he can give attention. Moreover, hospitalization is often though not invariably required, not necessarily for a long period, but to put the patient in the way of such treatment as will relieve pain, favor healing and perhaps permit ultimate local amputation, as of a toe. However, relief such that restoration to an active life and an occupation requiring normal vigor is secured cannot be considered probable. Such an event would be rare.

Amputation of a limb is often required. In that case, all of the leg below the knee will invariably be removed. Hospitalization for many weeks will be inevitable. A surgical fee must be added to the hospital expense. A determined person, otherwise well, will afterwards be able to secure and use an artificial leg, but, again, will be unable to resume an active, vigorous life; and the average individual will be unable even to use an artificial leg.

It will be seen that serious aggravation of the arteriosclerotic state by injury is likely to disable the individual, doing away with wage-earning at his or her original trade or occupation. In addition, hospitalization will usually be required, often for a considerable period. Amputation of a limb will call for prolonged hospitalization, a surgical fee and, in some cases, the expense of an artificial leg. Much of the disability is inherent in the age and lack of vigor of the injured person; that is, a disorder which would not disable a young or middle-aged individual usually disables the victim of arteriosclerotic disease.

Thromboangiitis Obliterans: Buerger's Disease

Although the veins as well as the arteries are involved in this disease, arterial deficiency is again the essential feature. The individuals attacked are far younger, however, than is the case with arteriosclerosis, and the disorder is capable of taking a greater variety of courses. The more elastic blood vessels of early life are able to establish new pathways, circumventing local arterial obstruction to a degree altogether beyond the capacity of the harder, older vessels of arteriosclerosis.

Thromboangiitis obliterans is almost exclusively a disease of males, so much so that this diagnosis, in any illness of a similar nature in a female, is accepted only after the most rigid scrutiny.

The disease is most apt to show itself in early adult life, that is, in the thirties and forties. However, it is not at all rare in the twenties, and has even been recognized in boys of fifteen to twenty. When the disease occurs in the sixth decade, a distinction from arteriosclerosis is difficult and of no great importance.

No cause is known. Some adverse influence of an inflammatory sort affects the blood vessels of the limbs, the legs primarily and almost exclusively. Seldom, and rarely in a serious form, it may involve the hands.

No actual infection has ever been proved, yet certain aspects of the disease suggest that something irritative and even destructive gains access to the blood vessels from the toes (and fingers). There is no question that tobacco smoking has a decidedly bad influence upon the course of the disorder, but this does not imply that it is necessarily a cause.

Pathology. The basic lesion is an inflammation of the walls of both arteries and veins of the limbs. With this, as a natural consequence, thrombosis is invariably associated. Vessels of medium size are the ones first involved. Buerger maintains that the most characteristic, acute, inflammatory changes, marked even by occasional abscess-like collections of pus cells in the thrombus, are seen in the superficial veins, that is, those outside the muscular mass of the leg. However, these superficial veins are involved in only about one-third of the cases. It is probable that some good-sized artery (and vein) belonging to one of the three main, deep systems below the knee is first attacked. Progressing in relapsing fashion with intervals of quietude, the thrombosis may extend in either direction, finally occupying the greater part of one or more of the three main trunks and even, in the most serious form of the disease, penetrating into the smaller vessels of the feet and toes. In that case gangrene, very much like that of arteriosclerosis, sets in. The thrombosing process need not necessarily obstruct completely the arteries and veins it involves. Narrow channels are often left as the thrombus is converted into scar—organized, in medical parlance—but no vessel which is attacked ever again carries more than a small fraction of the original blood stream. The tendency in the average case is to diversion of the arterial blood from the large and medium to the finer vessels or arterioles, a process which requires years. Sometimes the femoral artery—the main vessel of the leg—is obstructed high up in the upper thigh, in which case the blood is often able to flow through newly opened channels about the blocked vessel and supply the peripheral parts through the relatively normal ones beyond. Actually, as already stated, it is when the small vessels of the feet and toes are diseased that the condition is most serious, for then a collateral circulation cannot be established to supply these distant parts.

Symptoms. The disease is able, occasionally, to establish itself without causing any symptoms. Pain is a late, never an early symptom, and even intermittent claudication on walking, the one characteristic early evidence of the disorder, need not be observed in persons pursuing a sedentary occupation. As a rule, just as already has been told of arteriosclerotic vascular disease, the individual first notices a cramp-like sensation in the calf of the leg on walking. This appears constantly when he walks for a particular distance at a particular pace so that one is accustomed to say that the painful lameness occurs after walking one or two blocks, or perhaps a quarter of a mile. If the individual attempts to continue walking, the pain increases, finally involving the whole lower leg and radiating up the thigh. If the victim sits down, however, or even stands still, the pain dis-

appears in a few minutes, and he can walk on as before. Hence the term "intermittent claudication," or "intermittent limp."

At this early but characteristic stage, which may persist for months or even years, the appearance of the affected limb—the two are seldom involved to an equal degree—is usually quite normal. If any change is evident, the foot and toes may appear a little pale. In that case, the individual will be apt to notice some slight feeling of coldness or even a tendency to "numbness" in the foot. Atrophy of the muscles, so common in arteriosclerotic arterial deficiency, is absent.

A later stage is marked by some degree of redness or blueness of one or more of the toes, especially the great toe. A part of the forefoot may even show the change, with which some slight swelling is apt to be associated. The discoloration is increased upon dependency and disappears on elevation, but in that position is succeeded by an unhealthy whiteness. At this time, spontaneous pain usually sets in. It has a disagreeable, burning quality, is apt to be made worse by elevation and diminished by depression of the limb. Even now, no ulceration or gangrene need be present, though both are threatened, and the subject is crippled. The affected foot is often sensitive to handling. Even in the absence of injury, the disease tends to progress. For dependency leads to swelling (edema), which in turn interferes with the already deficient blood supply of the part, a vicious circle.

A late stage is marked by actual ulceration or gangrene. The tip of a toe, a spot beside a badly curved nail, or over any bony prominence, often becomes deep purple and then black; or a small ulceration forms in one of these areas. The disorder is much like that of arteriosclerosis, though there is somewhat better resistance to infection. Pain, however, is decidedly more severe, persistent and disabling. If uncontrollable, pain rather than gangrene enforces amputation.

The course of thromboangiitis obliterans may be judged from the above account of the pathologic changes and symptoms. It is slow and subject to progress and recession. Fulminating cases are rare. Very chronic ones, marked by an intermittent limp in one leg, which persists for years without change, are not uncommon. Injury is very apt to lead to so rapid a development of the disease that it appears actually to have caused it, but ill-advised treatment of an "ingrowing" toenail or of a corn or callus is nearly as apt to be the exciting, aggravating factor.

A very interesting matter is the possible relation of the fungi of the skin and nails to the disease, that is, the dermatophytoses and onychomycoses, for which the layman's name is "athlete's foot." Certainly, secondary infections with bacteria are introduced through the desquamations, cracks and serious deformities of the nails due to these diseases. Conceivably, the tissues may become oversensitive to the proteins of the fungus. In any case, treatment of serious infestation with fungi is valuable in a prophylactic way and influences favorably the course of the disease. Allusion has already been made to the relation of tobacco smoking to thromboangiitis obliterans. One often

sees a superficial wandering phlebitis heal and fail to recur as a result of withdrawal of tobacco, and occasionally a dramatic relief of pain.

Considerable space has been given to an account of the pathologic changes, clinical symptoms and course of this rather common disease to bring out its capacity for latency, for periods of activity and quiescence and for responding, favorably or adversely, as the case may be, to a number of factors. These must be kept in mind in analyzing the effect of injury.

In respect to evidences of a defective arterial circulation, reference should be made to the various tests described under arteriosclerotic arterial deficiency. In general, these tests are equally applicable in both diseases. The roentgen-ray, of course, will not reveal the calcification of the arteries characteristic of arteriosclerosis. But the colors in the skin, the reaction to elevation and depression of the limb, and the presence or absence of the arterial pulsations mean just what they do in arteriosclerotic arterial deficiency. Naturally, the comparative youth of those suffering from Buerger's disease makes the small vessels of their toes and feet more responsive to external temperatures, and thus the color of the toes often changes rapidly (and individually) as their surroundings vary between coolness and warmth. Such vasomotor effects are partly responsible for the "red, white and blue" toes of Buerger's disease.

Aside from the appearance of inflamed thrombosed superficial veins in a small proportion of cases, there is no visible sign of the involvement of veins in the disease. The tests relate wholly to the state of the arteries.

The Relation Between Thromboangiitis Obliterans and External Violence

The effect of a blow, crush, sprain or wound upon a limb, already the seat of thromboangiitis obliterans, is to bring out, rather dramatically in some cases, evidences of disease and to hasten its course. The failure of repair in response to injury when the arterial blood supply is deficient has already been explained. This occurs in Buerger's disease just as in arteriosclerotic states; and injured tissues become discolored, or partly gangrenous, or wholly gangrenous, according to the degree of arterial deficiency and the nature of the injury. Wounds heal badly and, in consequence, infection is threatened.

Over and beyond such immediate effects as the above, the disease itself is decidedly aggravated. Let it be supposed that a man of 30, supposedly well, is injured by the dropping of the edge of a heavy box upon the base of his left great toe. The skin is not broken. He tries to continue work but finds the toe painful and gives up after a few hours. Beyond some black-and-blueness, the region of injury is little changed for a day or two, but soon the great toe becomes reddish-blue and increasingly painful. There is swelling of the toe and adjacent foot. In the course of a couple of weeks, a sore appears beside the toenail or the tip of the toe becomes black. Then

it is observed that the other toes are a little red, shiny and swollen. The adjacent foot shows a touch of this change. The man objects to handling of the toes and finds pain increased by elevation of the foot. Now perhaps it is noticed for the first time that the arterial pulses of the left foot are absent. To the touch, it is cool below the ankle. On elevation, the toes and foot appear a dead white. On depression, the toes, especially the great one, are purplish, the forefoot red, but shading upward into a normal color.

The state just pictured is a fairly advanced stage of Buerger's disease, brought on within a few days, and well developed within a few weeks, by a moderate injury. Perhaps an ill-advised attempt is made to amputate the partly gangrenous great toe, as a result of which a lifeless open wound is left. Even if healing occurs, the foot is left in some degree painful, the individual is crippled and cannot work. Thrombosis has probably spread from the region of injury by way of connecting blood vessels. Had there not been some background of disease present, the bruise would have healed after a short period of soreness, as most bruises do.

However, this may not represent the whole story. When the condition in the injured leg has been stabilized, a careful examination will be apt to show that the pulses in the second foot are weak—one of them may well have disappeared. There is often a suggestion that with the acceleration of the disease in one leg have been associated the first signs of trouble in the other. Just why this should occur—it need not—is far from clear. But it is a rather familiar observation that while an individual is confined to bed by a process of thrombosis ("phlebitis") in the veins of one leg, a similar process occasionally starts in the other. Something of the same sort may occur here.

Other injuries than a bruise are capable of producing similar changes. These include accidental wounds and abrasions as well as the cutting of corns or calluses and purposeful but ill-advised operative treatment of a deformed nail or toe. Such things should be inquired into in connection with the alleged incitement or aggravation of thromboangiitis obliterans by injury.

The Evidence of Injury. In the absence of other causes and even in the absence of any previously recognized symptoms, the appearance of reddish-purple discoloration and swelling, following within one or two to 10 days of an injury, indicates that a latent thromboangiitis obliterans has been activated. Often a careful interrogation will, of course, disclose a story of earlier lameness on walking. The age of the individual will be of no great importance, provided it is under 50.

In addition to the color changes and disappearance of the pulses at the ankle, a study of the arterial oscillations in both legs will often be important. If a blood pressure cuff connected to an aneroid sphygmomanometer is firmly wrapped about the calf and inflated as if to record the blood pressure, the arterial beats will give a regular vibration to the indicator needle. The vigorous excursion of the needle in the normal person being known, a les-

sened excursion in a case under study suggests strongly that the large arteries in the leg are in some degree obstructed by the disease.

It goes without saying that, provided the individual has sufficiently recovered from the local disorder of the toes and can walk with reasonable vigor, the subsequent occurrence of the characteristic intermittent limp offers confirmatory evidence that Buerger's disease is now established.

Evidence that the signs of disease, alleged to have been caused by an injury, are due to aggravation of thromboangiitis obliterans, rests upon the appearance of the toes and foot (by contrast with the previous state), the prompt appearance of the changes and the incapacity of the individual. The arteries will not appear calcified by roentgen-ray. A normal state of the opposite leg does not deny the diagnosis of Buerger's disease; but diminished strength or absence of one or both of the arterial pulses in the opposite leg confirms the contention that the disease is present.

If the injury is alleged not to have been the cause of swelling, discoloration and other signs indicative of the disease, it would be necessary to show that these signs had been present before the injury and had persisted without significant change. As in arteriosclerosis, it is beyond probability that noteworthy effects of thromboangiitis obliterans should appear spontaneously as a coincidence with the injury.

That thromboangiitis obliterans did not enter into the disorder precipitated by the injury would only be indicated by the absence of characteristic signs of the disease in the injured leg, already described.

Thermal Injuries: Exposure to Heat and Cold. To heat, the tissues in thromboangiitis obliterans react just as do arteriosclerotic tissues; that is, heat calls for a metabolic activity for which a blood supply is not forthcoming. Thus, the terminal parts of the foot are readily injured by heat, the skin destroyed and ulceration established.

Severe cold, that is, actual freezing, causes gangrene of the parts exposed. It must be supposed that, owing to the diminished arterial supply, frostbite under these conditions occurs more rapidly than is the case with normal tissues.

Exposure short of freezing is likely to increase the contraction of the smaller arteries of the toes and feet. There is present in these vessels an element of irritability, that is, their muscular walls are readily thrown into spasm by cooling. This is an exaggeration of a normal reaction to cold already described, and indeed an excessive vasomotor irritability in response to cold is not by any means peculiar to thromboangiitis obliterans. However, the effect of exposure to cold, if serious or repeated, is likely to aggravate the disease.

Economic Aspects of Thromboangiitis Obliterans. The age of most individuals suffering from this disease holds out a promise of a considerable degree of recovery and some economic rehabilitation.

The mild form of the disease, of which the only evidence will be intermittent claudication and lessening of strength in, or actual disappearance of

the pulses in the feet, limits the individual's ability to work to the extent that it lowers his capacity for locomotion, and for operation of a machine requiring active use of his legs. Moreover, it exposes him to aggravation of the disease by injury. Only in a small proportion of all cases is treatment able to remove such incapacity as is present.

The serious form, marked by purplish discoloration, ulceration and even gangrene of toes, can frequently be checked and improved, usually after a considerable period of treatment, a matter of many weeks and sometimes months. Let this be called "relief," not "cure." The younger the individual, the better the chance of recovery. Even the loss of several toes is consistent with a reasonably active life, though not with a strenuously athletic one. If relief for any reason is not obtained, the disease is totally disabling. Even if a limb is not lost, the persistence of a wearing pain renders the individual unfit to give his attention to an occupation requiring intelligence and care. Relief, however, seldom restores the individual to his previous full health. For one thing, he will seldom be able to walk fast or far, and he will never be able to run for any considerable distance. For another, he is susceptible to further accident and, consequently, to reactivation of his disease. He dare not engage in any hazardous occupation. On the other hand, he is free from pain, his general health is unimpaired, and he can give his full mind to his work, such as it is.

If relief of pain and ulceration is secured by amputation of a limb, the individual is fit only for a sedentary occupation. His amputation will leave him without a knee-joint in the amputated limb. Only an unusually determined person can lead an active life and never a strenuously athletic one. This is partly because the second leg is almost certain to be diseased in some degree. If both legs are seriously diseased, the individual must be held to be totally disabled, being fit only for such work as he can do in the house.

Relief of the disease is greatly at the mercy of the individual's eagerness for it and his determination to secure it. For example, if the painful period is prolonged, he may prove so lacking in resistance to pain as to have acquired a drug habit. Above all, if he will not abandon tobacco smoking, his disease will almost necessarily persist and indeed will probably be aggravated. Thus, the victim of thromboangiitis obliterans whose disease is developed by injury may fail to seize an opportunity offered him for improvement and rehabilitation, a tendency which is emphasized by the demoralizing effect of the expectations of damages and insurance. Such considerations as the above are significant even when the treatment secured is ideal and not merely of average value.

MEDICAL FACTS THAT CAN OR CANNOT BE PROVED BY ROENTGEN-RAY; HISTORICAL REVIEW AND PRESENT POSSIBILITIES *

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INTRODUCTION

As the science of the practice of medicine has progressed, new discoveries have brought out newer methods of diagnosis and treatment. With the discovery of roentgen-rays by Professor Wilhelm Roentgen in 1895, an entirely new field was opened. The growth of this new field of medical radiology has been unusually rapid and of great importance. Radiology embraces the use of roentgen-rays, radium, and other radioactive substances. Roentgenology is a division of Radiology in that it is limited to the use of the roentgen-rays or x-rays, and medical roentgenology may be termed as the use of roentgen-rays for the diagnosis and treatment of diseases, deformities and infirmities.

In the development of this field of medical science not only medical specialists but also engineers and physicists have made many contributions. At first roentgen-rays were used to demonstrate the presence of opaque foreign bodies or broken bones in the human body. With the increase in efficiency in improved machines the pioneers in this new medical science began further experiments to determine the possibilities of this new invisible light. Experience and shrewd observation, combined with a knowledge of pathology, built up for them an ability to interpret properly the shadows they saw upon the finished plate. As the apparatus became more highly developed the technics of the roentgenologists also became more extensive and specialized. These men soon came to be recognized as specialists, and they formed organizations for the exchange of ideas and new procedures. Since that time, the practice of roentgenology has been, in the eyes of the medical profession, the practice of medicine.

Although it may be said that finished roentgen-ray films, properly termed roentgenograms, are merely celluloid records and that roentgen-ray machines are merely so much metal and oil and rubber, the essential element of medical roentgenology is the physician specialist. It is he who makes the examination, that is, directs the technical procedures and subsequently interprets the shadows on the finished photographic film. Those physicians and laymen who regard a piece of equipment as the answer to any given technical problem are laboring under a false impression.

ROENTGEN-RAYS AND THE COURTS

The knowledge gained from scientific discoveries soon makes its way into the courtroom as a means of bringing convincing evidence to the jury.

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The study of finger prints and ballistics, for instance, has found a permanent place in administering justice in criminal cases. Chemists and toxicologists are often brought to court to present scientific facts before juries, and photographs had been used as secondary evidence long before the discovery of roentgen-rays.

One of the first suits in which roentgen-rays were introduced as evidence occurred in Nottingham, England, within four months after Roentgen's discovery. The first civil case in America in which roentgen-ray films were presented and admitted as evidence was that of *Smith v. Grant,*[1] and the Haynes murder trial of 1897 [2] was the first criminal case in which roentgen-ray evidence was introduced.[1] The introduction of roentgen-ray films as evidence in personal injury suits is now practically the rule instead of the exception.

Conflicting points of view exist between the medical and the legal profession. Because the results of experimentation are uncertain and might result in unfair opinions, it is a function of the law to administer the kind of justice which has been arrived at through the experiences of the past. The medical mind has been trained for experimentation. Basically the legal mind leans toward tradition and precedent whereas medicine as a science is constantly discarding long used methods as newer and better ones are discovered. As a result, the law must be cautious in accepting new discoveries for, as has been stated, legal decisions are based on precedent. On the other hand, in the medical world the tendency is to swing towards a new treatment or method of diagnosis with unreasonable enthusiasm, perhaps only to find after a few years of trial that such method is not as efficacious as it was thought to be at the time of its introduction.

The first objection to the introduction of roentgen-ray plates as evidence was based on their inherent weakness and fallibility. Experts testified that no one knew anything about the new rays, and the courts ruled that juries should not be misled by something that was admittedly an experiment. However, within 20 years the courts treated the roentgen-ray as an authentic agent of medical science (*Prescott & N.W.Rd.Co. v. Franks* (1914).[3] The trust which the courts place in the roentgen-ray today is illustrated in *Block v. Seibold* [4] (1928), in which the Supreme Court of Wisconsin said "The physicians called by both plaintiff and defendant, when questioned as to what extent, if any, the injuries would be permanent, were practically agreed that no definite answer could then be made in that regard without at least having the aid of an x-ray picture." Although this opinion was rendered in a case involving bone injury, the principle may properly be applied to other phases of roentgenology.

[1] *Smith v. Grant* (1896), 29 Chicago Legal News 145.
[2] *State v. Haynes* (1897), 56 Albany Law Journal 309.
[3] *Prescott & N.W.R. Co. v. Franks,* 111 Ark. 83, 163 S.W. 180 (1914) Ann. Cas. 1916 A, 773.
[4] *Black v. Seibold,* 195 Wis. 114, 217 N.W. 694 (1928).

Every court in the land is clogged by numerous personal injury cases, and the State Compensation Commissions are always burdened with cases awaiting a hearing. Into these courts and before the Labor Commissioners there is a veritable parade of clients and their attorneys armed with roentgen-ray films, and accompanying them are those who are willing (for a fee) to testify as to the irrefutable evidence presented by the roentgen-ray, irrespective of the number or diagnostic quality of the films. Even the best trained roentgenologist cannot be expected to arrive at a satisfactory conclusion when he is confronted with an insufficient number of films of poor diagnostic quality. Although the courts are willing to accept properly authenticated roentgenograms in evidence as "pictures," they do not, it seems, ask the question, "A picture of what?" It should be apparent that having such a "picture" made and interpreted by some one qualified to do so is of the utmost importance. This principle, which can be applied to the interpretation of roentgen-ray films as well as to any other testimony of a scientific nature, was given in the celebrated and oft quoted case of *Ewing v. Goode*,[5] in which it was stated ". . . when a case concerns a highly specialized art . . . with respect to which the layman can have no knowledge at all, the court and jury must depend upon expert evidence." [1]

The general tendency has been to refer to roentgen-ray films as secondary evidence. That is, they are not employed to prove conclusively that a certain condition existed at the time of injury or at the time they were made, but, rather, are used to aid the witness in explaining his testimony. In other words, the courts have transferred bodily to roentgen-ray films the rules of admissibility applied to photographs, maps, and diagrams; and the truth and accuracy of such films are protected by these rules. It should also be noted that roentgenograms are regarded as constituting a part of an objective rather than a subjective examination. This technical point of law is brought out in *Reeder v. Thompson et al.*[6] Therefore, the law has taken cognizance of the fact that by means of roentgen-ray machine the bones of the human body can be shown and that the "pictures" or roentgenograms may be admitted as evidence if they meet the rules of admissibility.

In order that it may be clear that the roentgen-ray is not the all-seeing eye but that correct interpretation of the shadows seen upon the roentgenogram must be made in order not to mislead the jury, the courts have repeatedly recognized the necessity of accurate portrayal of the parts to be examined and an accurate description of the findings. *City of Covington v. Bowen*,[7] *Stevens v. Ill. Cent. Ry. Co.*[8] In *Vale v. Campbell*,[9] the Oregon Supreme Court recognizes the necessity of correct portrayal and expert interpretation. Numerous other decisions along this same line can be cited

[5] *Ewing v. Goode*, 78 F. 442 (1897).
[6] *Reeder v. Thompson*, 120 Kan. 722, 245 P. 127 (1926).
[7] *City of Covington v. Bowen*, 191 Ky. 376, 230 S.W. 532 (1924).
[8] *Stevens v. Illinois Cent. R. Co.*, 306 Ill. 370, 137 N.E. 859 (1923).
[9] *Vale v. Campbell*, 123 Or. 632, 263 P. 400 (1928).

to show that the roentgenograms are the best available evidence of what they show, but wholly fail to convey to the ordinary layman the facts as they are actually shown unless interpreted by an expert roentgenologist.

Technics and Procedures

Discussion of the possibilities of the demonstration of disease conditions by roentgen-ray must keep in mind that what cannot be demonstrated today may be a more or less simple procedure in the future. The first medical uses of the roentgen-rays were, for example, to demonstrate the bones of the body and the denser structures and organs which cast a recognizable shadow on the fluoroscopic screen or on a photographic plate or film.[2] Important developments in technic have taken place during the years, and recently the roentgenologists have centered their attention more on the soft parts. The progress made in recent years without the use of contrast media seems due largely to the ultimate recognition that differences in density do exist which were formerly not noted or appreciated. Every roentgenologist has been able to see and interpret shadows on films heretofore unrecognized by him until some one who had made a special study of a particular condition had figuratively rubbed his nose in them. In order that these shadows may mean anything, medical knowledge must be brought to bear upon them. Obviously the diseases that do not produce differences in density, either actually or potentially—to be brought out by contrast media, are not amenable to diagnosis by roentgen-ray, as they cannot be shown on a film or as it is called a roentgenogram. Perhaps the best definition that can be given for a roentgenogram is that "it is merely a photographic record of the different densities through which the x-ray has passed."

Because the diagnosis depends on difference in density, the lungs naturally offered a peculiarly effective field in that many respiratory diseases occupy with a denser material, which is demonstrable, the normally air-filled spaces of the lung. Even though the early fluoroscopic screens were not very efficient, the movements of the heart and thorax were next to come under observation. Along with this, and as early as 1896 the pioneer work was done on the gastrointestinal tract where by the use of an opaque substance in a bag the esophagus and stomach could be visualized.[2] Subsequently a bismuth meal and then later barium were introduced as media for a complete study of the intestinal tract. Each year brings forth some new method by which an organ or condition heretofore not possible to demonstrate, can be outlined and any change from normal interpreted. For example, the injection of iodized oil or air into the spinal canal as a contrasting substance has increased the accuracy of the diagnosis of spinal cord tumors to an unpredicted degree.[3]

Measured quantities of air introduced into the ventricles and around the brain has become an essential examination to be employed for the benefit of the brain surgeon.[4] Contrast media are also used to outline the extent and

size of fistulous tracts and to determine the existence of tumors of the breast [5] or within the abdominal cavity,[6] the patency of the Fallopian tubes,[7] and the site of obstruction in bronchi.[8] Also, by injection of a specially prepared dye into the blood stream the entire urinary tract can be seen,[9] and the function of the gall-bladder can be shown by the administration of a drug either orally or intravenously.[10] Another radiopaque substance may be injected into the blood stream; and by means of numerous films made in rapid succession the chambers of the heart, great vessels and their tributaries may be outlined.[11] Practically all of these procedures have been introduced within recent years, and research work is being conducted in order that newer methods of diagnosis can be perfected.

If one merely surveys an index of diseases and their complications, it becomes apparent that there are very few in which roentgen-ray is not of some help. The lesion may be demonstrated directly or indirectly by showing changes that are caused by that one particular condition. For instance, a dysfunction of the ductless glands of the endocrine system causes changes in the development of the bony skeleton or body as a whole.[12] Calcium deposits in the glands themselves can be shown and the ovaries and adrenals can be outlined by injection of air as a contrast medium into the abdominal cavity.[13, 14] The thymus and thyroid and their size and shape, if abnormal, can be demonstrated without special technic.[15] In other words, the disease of the ductless glands cannot always be demonstrated by roentgen-ray, but the results of their altered function are known and recognized by the well trained roentgenologist.

There never was and there never will be a perfect answer as to what possibilities exist for diagnosis with roentgen-ray examination. If the examination is done by the most competent available radiologist in the locality or the most competent available physician, there are no limits that can be expressed today that will hold for the future. If, however, the films are made and interpreted by any physician or surgeon who happens to have the case, there are such extensive limitations that it would require a treatise to list them all.

In the development of any paper directed towards evaluating criteria in the field of scientific proof as an adjunct to the field of evidence, it is timely to stress that on some occasions untrustworthy evidence may be accepted as final when in reality additional scientific evidence could have been obtained. In *Hollister v. Robertson* [10] (1923) the court said it was unwilling to follow its opinion in *Lasher v. S. Bolton's Sons,*[11] (1914), to the effect that the court was "without the power to require such an x-ray examination."

Possibilities and Limitations of Diagnosis by Roentgen-Ray

Keeping in mind that roentgenology is a rapidly advancing science and is subject to new discoveries, one may tentatively list those conditions which can

[10] *Hollister v. Robertson,* 208 App. Div. 449, 203 N. Y. (Supp.) 514 (1923).
[11] *Lasher v. S. Bolton's Sons,* 161 App. Div. 381, 146 N. Y. 321 (1914).

and which cannot be diagnosed by roentgen-ray today. In doing so, it is probably best to enumerate them according to their anatomical location. Since the fundamental precepts for roentgen-ray examination and diagnosis are that the shadows upon the film are records of density, either inherent in the body or introduced for the purpose of contrast, our first conclusion is that a diagnosis cannot be made if a difference in density cannot be demonstrated.

In listing the diseases, it is necessary to show, as a point in differential diagnosis, some of the conditions existing in a particular organ or part of the body that can be demonstrated in both its normal and abnormal state. Thus, the reasons why some conditions are diagnosable and why roentgen-ray examinations are not reliable in others will be disclosed.

Head. Injuries and diseases affecting the head are of great importance as it is there that the central nervous system and the control of the senses are located. A great number of industrial and automobile accidents result in head injuries and lead to litigation. At the present time it is a fair estimate to state that perhaps half of the fractures of the base of the skull are not easily and readily demonstrable by roentgen-ray. This is due to the fact that the line of cleavage is not separated widely and often occurs in a plane that is obscured by the overlying shadows of other parts of the skull. Body section laminography [16]—sectional radiography—has not yet been perfected to such a degree of accuracy that it is the answer to this problem of demonstration of basilar skull fractures. Another handicap in such cases is that when first seen, the patient is usually unconscious and incapable of full cooperation with the technician in making films in various projections. Roentgen-ray findings are usually negative in cases of concussion and in post concussion and post traumatic changes within the skull cavity.

Differentiation between fresh and recent fractures often presents a problem when a patient has had more than one head injury within a short time but when roentgen-ray examination follows the last injury only. Small subarachnoid hemorrhages, apoplexy and cerebral arteriosclerosis do not show sufficient changes to be amenable to roentgen-ray diagnosis. Occasionally some abnormality is shown in the roentgen-ray examination of the head of an epileptic patient, but even this does not offer conclusive proof that its existence is the cause of the epileptiform seizures. For this reason it would have little weight as evidence if it was alleged that the epilepsy was the direct result of any injury.

Teeth and Jaws. Thus far nothing has been said pertaining to roentgen-ray examinations of the teeth and jaws. The mandible and maxilla which may be considered in the same manner as other bones and subject to fractures, tumors and infections, are as easily accessible for radiographic examination and diagnosis as any other bone.

Dental roentgen-rays are a necessary part of every dental examination for the discovery of apical disease and unerupted teeth, and may be termed as imperative when searching for a focus of infection. Dental films have been introduced as evidence in court as a means of identification in criminal

actions when bodies could not be identified but when the shadows of the metallic fillings could be identified by the dental surgeon who had done the work upon the teeth. Diseases of the salivary ducts may be shown by injection of a contrast medium, and calculi in the glands themselves or in the ducts may be shown in the same manner as a calculus in any other part of the body.

Eye. Non-opaque foreign bodies in the eye as well as soft tissue lesions of the eye ball and orbit are not demonstrable unless they have caused secondary bone changes. The cup shaped bony structure of the orbit precludes fine definition of the soft tissues of the eye and its various surrounding structures. Opaque foreign bodies in the eye can be detected and localized.

Nose and Throat. Most conditions of the nose and throat, with the exception of the cavities of the nasal accessory sinuses, the middle ear and the mastoids, are diagnosable by direct observation by the examining physician. Although allergic rhinitis with edema of the mucous membrane of the structures may simulate, on the roentgen-ray film, the density of a pathological process within the sinuses, it can be differentiated from sinus disease by the clinical history, clinical findings, and sensitization tests. Here it may be said again, that, in many instances the roentgenographic findings are not always the last word, but are to be considered with other findings in arriving at a final conclusion.

Chest. As has been stated, the heart and lungs drew the attention of radiologists in their early endeavors. The normal density of the structures and the readily demonstrable changes caused by the substitution of new densities when disease occurs, combined with the comparative ease of examination, particularly lend the chest to comprehensive study. Tuberculosis, pneumonia in its various forms, pleural effusions, and foreign bodies in the bronchi are all well publicized; and when such a condition is suspected, the laity consider the physician in charge of the case derelict in his duties if he does not include in his examination a radiological consultation.

Silicosis and the various pneumoconioses have received their share of attention within the last decade as a result of the enactment of laws declaring them to be among the industrial and occupational diseases for which compensation may claimed, *Jones v. Rinehart and Dennis Co.*[12] (1933). The second and later stages of silicosis, asbestosis, anthracosis and similar conditions are diagnosable by radiological examinations; and, in addition, it can be determined by the same means whether or not another disease is superimposed.[17]

In respect to the medico-legal possibilities of inhalation occupational diseases and the possibility of post-war claims, if gas is used, one must consider the effects of noxious gases upon the mucous membrane of the tracheobronchial tree, in which the roentgen-ray findings are nil, although the patient may have severe, acute or chronic symptoms. Spray painters, using lead paint, are subject to lead poisoning which may be discovered by means of

[12] *Jones v. Rinehart and Dennis Co.*, 113 W. Va. 414, 168 S.E. 482 (1933).

clinical laboratory findings or demonstrated roentgenologically in other parts of the body. Spray painters using cellulose products do not show any lung changes roentgenologically. Fungus infections in the lungs resemble other acute respiratory infections. Diagnosis is usually confirmed by finding the specific organism in the sputum. Diagnosis by roentgen-ray of syphilis of the lung is doubtful.

Heart and Aorta. A roentgen-ray examination of the chest does not mean that the person observed has had an examination of the heart even if the shadow of the heart is outlined upon the film. In some cases of heart disease and in congenital lesions the heart outline on the film will be an indication for further cardiac study. A complete examination of the heart roentgenologically is a special procedure done by tracing the heart outline by means of an orthodiagraph, or with films made in more than one projection at a distance to produce the minimum of distortion, conventionally seven feet tube-film distance. Calculation of the cardiac size is then made from measurements of the heart silhouette.[18] Special examinations may be made by means of the kymogram, in which a grid moves across the film during a set interval of time, and the alterations in the markings caused by the movements of the heart are interpreted.[19] All of these findings should be correlated with those of the electrocardiogram and clinical examination by means of the stethoscope. Special examinations of the heart and great vessels may be made, as stated previously in this paper, by injection of a radiopaque substance into the blood stream,[11] i.e., angiography, but the technic of such examinations is barely beyond the experimental stage and is not used under ordinary circumstances at the present time.

This experimental work has also shown that coarctation of the aorta—a congenital by-pass of the great vessels—of a minor degree can be shown by angiography whereas formerly the diagnosis was made from a scalloping defect in the ribs caused by a change in the collateral circulation of the intercostal arteries.

Aneurysm of the aorta and aortitis may be diagnosed by roentgen-ray and can be differentiated from lung tumors, mediastinal masses, and other chest conditions by using films and fluoroscopy or in special cases the kymograph combined with the other two methods. Disorders of the pericardium are detected by the same roentgenographic procedures as are used for study of the heart and aorta.

Abdomen. In listing those conditions of the abdomen which cannot be diagnosed by roentgen-ray, we must first turn our attention, as in other parts of the body, to the acute conditions. Acute appendicitis, acute pancreatitis, pelvic inflammatory disease and other acute infections do not always, and in many cases never, show diagnostic differences in density by the usual methods of examination. Any acute abdominal condition causing extreme pain and symptoms of shock should have the benefit of a survey film made in more than one position in an effort to detect the presence of free gas in the peritoneal cavity, thereby denoting that there has been a perforation at some

point in the gastrointestinal tract. The absence of free gas in such suspected cases indicates that further study must be made to rule out coronary heart disease, bowel obstruction or any other acute abdominal condition producing prostration.

In rupture or perforation of the liver or spleen, some roentgen-ray findings may be apparent, but they are certainly not convincing enough to make a positive diagnosis except in rare cases. Diseases of the spleen which do not produce enlargement or cause areas of calcification cannot be classed as among those which can be diagnosed by roentgen-ray.

Circulatory System. Diseases of the blood stream involving the components of the blood are not at all dependent upon roentgen-ray for diagnosis per se. However, positive bone changes in some of the hemolytic anemias, such as sickle cell anemia, may be some of the first noted changes in these cases. The leukemias may present diagnostic roentgen-ray changes or findings which indicate further clinical laboratory study to confirm the existence of the disease. Peripheral vascular diseases, varicose veins, and thrombophlebitis or obstruction of an artery, as well as of a vein, present no positive roentgen-ray findings in the usual examination. However, by special examinations and the use of contrast media, worthwhile information may be gained.

Examination in neurotrophic conditions which result in atrophy of the bones of the feet or hands, depending upon the extremity affected, such as Raynaud's disease, or tumors and injuries of the spine and Buerger's disease, i.e., endarteritis obliterans, a disease of unknown origin for which compensation has been claimed as aggravated by injury (*Hall v. State Compensation Com'r*[13] (1931)), show the bone changes but not those of the vessels even with soft tissue technic. Roentgenographic examination for these and similar conditions of the peripheral vascular system may require a special procedure in which a radiopaque drug, used for pyelography, is injected into the blood stream and films made during the injection to show the course of the vessel and point of obstruction or narrowing. By this same technic varicose veins and the collateral circulation set up around venous occlusion may be demonstrated.[20]

Bone and Joint. Even though the bony skeleton and its joints have always been before the eye of the radiologist, many difficulties arise in this part of the body, which is the easiest to show roentgenologically. Much attention has been given in recent years to the rupture of the nucleus pulposus of the intervertebral discs and the resultant changes which occur in the vertebral bodies. Herniation of the disc into the spinal canal, associated with severe low back pain, may occur, and although definite evidence of rupture can be shown by roentgen-ray, a positive opinion that the herniation extends into the spinal canal cannot be made without the aid of a contrast medium, either air or iodized oil.[21]

[13] *Hall v. State Compensation Com'r*, 110 W. Va. 551, 159 S.E. 516 (1931).

Once again we must turn to the acute conditions and state that those involving bone are not readily diagnosable by roentgen-ray. The radiographic findings in acute osteomyelitis are negative, but every radiologist has had the experience of being severely criticized because he was unable to demonstrate evidence of bone infection within a day or so after the onset of the symptoms. Before a diagnosis of bone infection can be made by roentgen-ray, it is necessary to wait until there has been sufficient change in the periosteum or in the uniformity of bone density in that area to show that it is not normal. Another of the acute conditions which must come under consideration is the differential diagnosis between early joint tuberculosis and a recent soft tissue injury. Clinically the two conditions may be very similar, and only after sufficient lapse of time can the decision be made by roentgen-ray. Soft part injuries to joints are usually negative in routine examinations, but by special procedures certain findings can be demonstrated that are convincing evidence that injury to the cartilage and ligaments has occurred.

Crushing injuries to the vertebral bodies are not difficult to show, but linear fractures and injury to the articulating portions require painstaking technic. In other instances linear subperiosteal fractures are not demonstrable immediately after the injury but are easily discernible after bone absorption has taken place about the fracture. Small areas of malignant metastases in the bones are not always visible even though clinically they may be suspected. This is due to the fact that not enough change has occurred in the bone texture to be seen and the area involved may be obscured by overlying bone cortex. In those aged persons who are suffering from demineralization of the bones, especially the spine, it is exceedingly difficult to be positive whether the crushing of one or more vertebral bodies is the result of a recent injury or whether the crushed body existed before that time and the symptoms were merely aggravated by the injury.

Ordinary soft tissue injuries such as sprains, bruises, torn ligaments, and hematoma are not examined by roentgen-ray to show the injury but to rule out the possibility of a concurrent bony injury. Many of these injuries, especially hematoma, may show pathological changes after a lapse of time by a deposit of calcium in the hemorrhagic area. Myositis ossificans—calcium deposit in the muscle—is a frequent post traumatic finding when negative findings existed at the time of injury.

Probably the most common complaint of a large percentage of the patients seen daily in outpatient orthopedic clinics is low back pain. From the point of view of the compensation insurance claim adjuster, a low back pain, alleged to be the result of a most trivial accidental injury, is the most hazardous he is called upon to settle. The sacroiliac joint is subject to the same conditions as any other joint, namely, inflammation and trauma. The differential diagnosis between pain arising from the lumbosacral region, the lumbar spine, and the sacroiliac joint should be made by the examining physician by means of a careful history and physical examination; and then

he should confirm his findings by radiographic consultation. More often, though, the physician expects the radiologist to make the diagnosis without clinical findings. If the patient has lost time from work, he claims compensation because of disability, and he expects the radiologist to testify that his films show evidence of the injury. In the great majority of acute sacroiliac cases the roentgenograms are negative, but special procedures may be resorted to in an effort to bring out additional evidence. In chronic cases sufficient bone proliferation has occurred to indicate to the trained roentgenologist the pathologic lesion present. In some cases the clinical findings of sacroiliac sprain may be accepted in court in lieu of the roentgenographic findings (*Taylor v. Southern Engineering Constr. Co.*[14] (1930)), in which a physician expressed the opinion that a sprain of the sacroiliac joint severe enough to cause total disability, will not necessarily cause a widening of the bony relations or other bone injury sufficient to show in roentgenograms. The court in affirming the award for disability accepted the above testimony over that of a physician who had testified that a sacroiliac sprain could always be shown in the roentgenogram.

In addition to strains, sprains, torn ligaments, and other injuries not detectable by roentgen-ray, another question which often confronts the orthopedist or roentgenologist is that of arthritis of the spine aggravated by injury. There is no word in the medical nomenclature that is misused more often than the word "arthritis," nor is there any word that is more likely to befog the medico-legal picture. The term hypertrophic arthritis has been and is still being used relative to the marginal changes found about the bodies of the vertebrae, cervical, dorsal and lumbar. Arthritis does occur in the spine, but it must be remembered that it can occur only in true diarthrodial joints, and of these the only ones in the spine are those between the inferior articular processes of the vertebrae and the corresponding facets of the vertebrae below. The term hypertrophic arthritis as commonly used by physicians is a descriptive term of the changes found. When, however, it comes to the industrial or medical legal use of this term, it may become a cause of unnecessary cost to the defendant corporation or insurance company. It is generally accepted that lipping, spurs and marginal deposits are brought about by chronologic or anatomic age, or both, and are physiologic in nature. Obviously then, there can be no aggravation of these changes as they are normal healthy bone.[22]

When one undertakes to state briefly what conditions, normal and abnormal, cannot be shown by roentgen-ray, he must immediately qualify that statement by adding "by routine examinations." Innumerable conditions that cannot be shown by the usual routine examinations can be very easily shown by a special technic or method. The simplest illustration of this is that stomach lesions cannot be shown by a film of the abdomen but are easily determined by a barium meal. A fracture which cannot be shown by routine examinations of the long bones can be brought into view by merely changing

[14] *Taylor v. Southern Engineering Const. Co.*, 13 La. App. 292, 125 So. 877 (1930).

the position of the part to be examined from the routine position to a slightly oblique one.

One of the perplexing problems that is often brought out in suits following non-union of fractures is whether or not there were soft tissues interposed between the fragments and whether the roentgen-ray would show such to be the case. In *Stoll v. Balazs*[15] (1929), the court takes judicial notice of the question and answers it in the following words: "There was evidence to show that it was the customary and usual practice to use roentgen rays in the reduction of fractures, and while they would not show a ligament or tendon between the ends of the fractured bones they would show that the bones had not been properly set so as to permit union." This may be a rather dogmatic statement in part, but the roentgenogram if carefully studied should lead one to be very suspicious of the possibility of the interposition of soft parts, and the subsequent treatment and observation should be carried on with this suspicion in mind.

Genitourinary System. In the genitourinary system practically every usual condition is amenable to roentgen-ray diagnosis. Some of the unusual conditions such as papillitis, carbuncle of the kidney, hemorrhagic nephritis, and their complications cannot be readily diagnosed. Rupture of the kidney may in some instances be diagnosed but not usually without the aid of contrast media. Dysmenorrhea, acute venereal infections, and early pregnancy are not within the province of the radiologist, although sterility due to obstruction of the Fallopian tubes and pregnancy in the later months are definitely radiologic problems. Abnormal positions of the fetus, abnormal development, single or multiple pregnancy, placenta previa,[23] and measurement of the pelvis to detect if deformities exist which will interfere with normal delivery[24] are now considered routine in many departments of roentgenology when a few years ago they would have been classified as special examinations. The sex of the child cannot be determined even though this is not an unusual question for the expectant parents to ask after a roentgen-ray examination.

Cerebro-Nervous System. In respect to the nervous system, obviously pain cannot be shown, but in some instances it is possible to demonstrate the existence of muscle spasm, thereby indicating that pain to some degree may be present and in that way rule out the possibility of total malingering.

Most of the diffuse organic neurological conditions such as multiple sclerosis, familial degeneration of the spinal cord, amyotrophic lateral sclerosis, nerve injuries—especially those of the brachial plexus at birth—do not lend themselves to roentgen-ray diagnosis. Muscle atrophy and the sequelae of the above and similar diseases do, however, in time, show sufficient changes to be noted on the film.

Meningitis in its acute forms offers very little if any information by roentgen-ray. The same may be said of encephalitis with the exception of toxoplasmosis encephalitis, which shows small calcified areas within the skull;

15 *Stoll v. Balazs*, 32 Ohio App. 117, 167 N.E. 522 (1929).

and it is by these characteristic shadows that the disease is diagnosable in infants.[25]

Gastrointestinal System. Undoubtedly a chest study is the most frequently requested of all roentgen-ray examinations, with bone and joint second. Then perhaps come the gastrointestinal and abdominal studies. In examinations of the gastrointestinal tract the percentage of correct diagnoses of all conditions by a competent radiologist is very high and exceeds those of the clinician. The study of the gastrointestinal tract has become an art, and the recent investigation of the small bowel,[26] giving an explanation of various digestive disturbances, has opened a wholly unexplored field for the radiologist. Lesions of the esophagus, stomach and large and small bowel have always been studied by means of contrast media and under direct observation upon the fluoroscopic screen. At the present time one may list acute appendicitis, acute gastritis, acute peritonitis, and some of the local gastrointestinal parasites as not offering roentgen-ray as the method of choice for a diagnosis. Some intestinal parasites can be demonstrated by giving the patient a specially prepared meal and subjecting him to frequent observations in order to show that the parasites have ingested the opaque material.[27]

Miscellaneous. The acute fevers, typhoid, malaria, and other acute systemic infections and the acute exanthemata are not now subjected to roentgen-ray examinations at all. Whooping cough in late stages does show some pulmonary changes, but roentgen-ray is not necessary for diagnosis. Tularemia in some cases shows changes in the lungs,[29] and undulant fever causes bone changes, similar in respects roentgenologically to those caused by typhoid.[29] Inguinal and other hernias, unless large enough to contain bowel coils that can be seen when filled with barium or air, are not subject to roentgen-ray examination primarily for diagnosis.

Undoubtedly a large number of diseases and conditions have been omitted from this paper, as any cumulative index of radiological literature will show. But at least it has been an attempt to show the fundamental requirements for this type of consultation and its value in medico-legal work. Many patients for whom roentgen-ray would be an aid in diagnosis are seen each month by physicians who are uncertain whether or not roentgen-ray would be of value. The radiologist and pathologist occupy an unique position in the medical world as they are dependent upon referred patients, and a very good slogan for physicians to adopt is that "When in doubt, ask your radiologist."

For instance, any injury or disease involving bones or joints of the human body, is from a diagnostic standpoint a radiological problem. In *James v. Grigsby*[16] (1923); *Taylor v. De Vaughn*[17] (1928), and in numerous other cases the decision of the courts has been that the physician in attendance was negligent in that he did not use roentgen-rays in the diagnosis and treat-

[16] *James v. Grigsby*, 114 Kan. 627, 220 P. 267 (1923).
[17] *Taylor v. De Vaughn*, 91 Cal. App. 318, 266 P. 960 (1928).

ment of a fractured bone. Scientific proof, such as roentgen-ray film, of the absence or existence of disease or injury is obviously required by the courts rather than a diagnosis made from clinical findings alone.

In certain localities and in certain clinics of this country radiologists have made a special study of some particular conditions and have reached a high proficiency in the diagnosis of that disease. Among the more prominent are: the radiographic diagnosis of early carcinoma of the breast and its differential diagnosis from benign tumors [30]; silicosis and allied inhalation diseases (especially by those radiologists in the mining and quarry districts) [31]; coccidioidal infections (on the Pacific coast) [34]; and those conditions which are more prevalent in certain parts of this country. This also holds true for the radiologists of foreign countries, who have the opportunity of seeing those conditions which are peculiar to their own geographic location, and in the diagnosis of which the radiologists of other countries would be on unfamiliar ground.

Predictions

Taking into consideration the rapid advances made by roentgen-ray in the past, one cannot but be optimistic about the many possibilities for diagnosis that this branch of medicine may produce in the near future. The successful results that have been attained by the development and perfection of various dyes for demonstration of the kidney and gall-bladder should stimulate investigation for further study of the glands of secretion. It is perfectly possible that there may be developed a chemical substance which would be electively secreted with the pancreatic juice, and such a procedure would undoubtedly shed some light upon the function of that organ and add to the now meager knowledge of diabetes. Even now it is possible, by selection of the kidney dye with the proper chemical formula, to determine whether the pathology in the kidney involves the glomeruli or the tubules.[33]

Science has made a great step forward in the development of the electron microscope, and it is not outside of the realm of investigation in light amplification that some one may perfect a fluoroscopic screen that will enable the radiologist to see objects of fine structure which he cannot now distinguish at all because he looks upon the screen with poor eye accommodation.[34]

The radioactive substances produced by the cyclotron and the peculiar affinity of these substances for various tissues, such as radioactive iodine for the thyroid, phosphorus for bony structures, and other elements now under investigation present innumerable possibilities.[35]

All of these changes will and must be accepted by the courts as other scientific discoveries have been accepted in the past, and toward an aid in scientific proofmaking this paper has been written.

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CRIMINAL INTERROGATION WITH THE LIE DETECTOR; EIGHT YEARS' EXPERIENCE BY THE MICHIGAN STATE POLICE*

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During the era since the last war the science of criminal investigation has enjoyed tremendous growth. This quarter of a century has witnessed the development of fingerprinting into a common, everyday procedure. Scientific firearms identification (improperly called "ballistics") is a development of the last few years. The employment of blood grouping examinations in cases of contested paternity, scientific determination of alcoholic intoxication and many other valuable procedures have all come into use during this same time. The medical profession can take pride in the fact that its members have contributed so generously to the development of this new field.

Probably the most spectacular instrument devised in this era is the lie detector. In localities where it is in common use it has provoked enormous public interest. The idea of being able to detect a liar by means of a machine is fantastic to the uninformed. Many scientifically trained persons who have not yet had the opportunity to see it in actual operation still regard it as a mixture of voodoo and hokum. The Michigan State Police for the past eight years have employed one of the better known lie detectors, the Keeler polygraph. Although other types of apparatus have also been employed from time to time, the results obtained with the polygraph have been the most satisfactory. However, the fact that the series of cases reported here is based on results with the polygraph should create no inference that there are not other makes of apparatus which will give satisfactory results.

For thousands of years attempts have been made to establish guilt or innocence by such procedures as the trial by ordeal, and its more modern counterpart, the "third degree." These found expression in an infinite variety of cruelties and were only uniform in expressing the frustration felt by the prosecutor and police. Under this system many guilty escaped, many innocent confessed, and all were mistreated.

Physiology Involved. When most persons deliberately tell a falsehood, certain physiological reactions take place. These may exhibit themselves as blushing, dryness of the throat, swallowing and many other ways. Following the pioneer work of Lombroso[1] Marston, Benussi, Larson and others, Leonarde Keeler in 1926 developed the polygraph. On a moving strip of paper this instrument records simultaneously changes in the blood pressure and changes in depth of respiration. Earlier investigators had noted that

* Received for publication February 8, 1943.

[1] Lombroso, C.: L'homme criminel, 2nd ed., 1895, i, 336–346.

immediately following the telling of a lie the blood pressure rose and soon fell again to approximately normal.

Likewise, it was apparent that during the telling of a lie and for a short time afterwards respirations were apt to be shallow. A period of shallow breathing was usually followed by extraordinarily deep respirations in an endeavor for the subject to recover his breath. Consequently by inter-

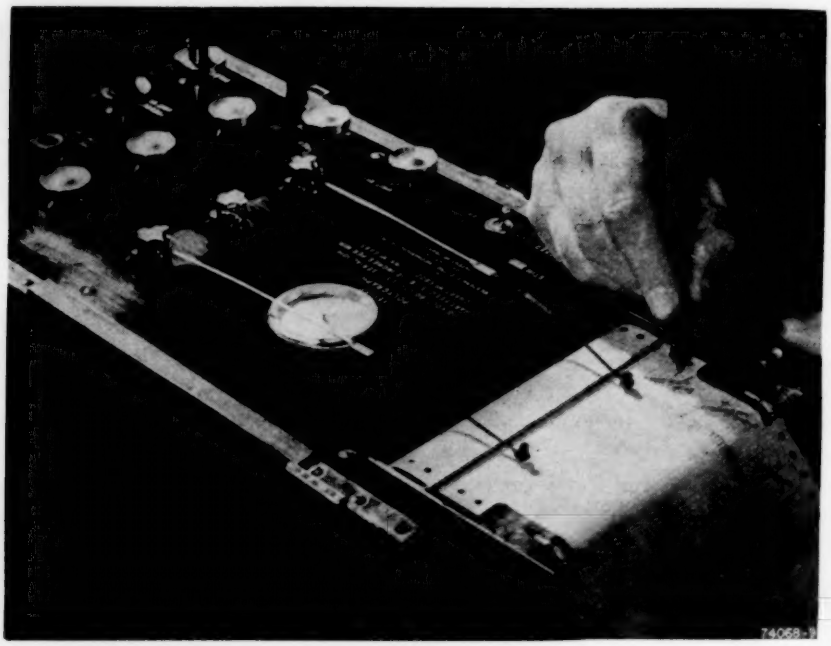


FIG. 1. The polygraph in operation. The operator makes an "x" at the point on the record at which the question is asked. Next to the operator's hand is the pen that records the blood pressure while the other one registers depth of respirations.

spersing the questions which are directly related to the crime with questions which have no bearing on the subject under investigation, it is possible to throw the significant changes into bold relief. For instance, a typical series of questions might be something like this:

1. Did you have breakfast this morning?
2. Do you smoke?
3. Do you drive a car?
4. Did you shoot John Doe?
5. Do you live in Michigan?
6. Do you know who killed John Doe?
7. Is today Thursday?
8. Have you lied in any of these answers?

Recently an electrodermal response unit has also been incorporated in the machine, which is a device for measuring fluctuations in the electrical

resistance of the subject during questioning. It is attached to the hand of the person being questioned and is of value in some cases. This unit has been used in only a few of the cases reported here.

The reaction of most persons is quite uniform when first informed of the lie detector and its method of operation. They express themselves usually about like this: "If I were ever put on the lie detector I would be so nervous that I am sure my reactions would indicate that I was guilty even if I were innocent." Fortunately such is not actually the case. Practically all persons exhibit some nervousness when first run on the polygraph. The experienced operator can detect this easily and make proper allowances for it. As a matter of fact, the records are very barren of innocent persons being unjustly accused by reason of their polygraph tracings. In our own experience, we know of no such case.

The next question is quite apt to be: "Is the machine infallible?" That question is exactly like asking whether a clinical thermometer, stethoscope, roentgen-ray machine or compound microscope is infallible. A trained scientist may be mistaken in what he sees or hears by any of these devices. Like the thermometer and stethoscope the polygraph is simply an instrument for noting or recording physiological processes and it is possible for the operator to be mistaken in his interpretation of the recording. Even in the best of clinics the interpretation of roentgen-ray film is not 100 per cent accurate, but that does not imply that the machine should not be used. The same can be said for the polygraph.

There are two essential requirements for the successful employment of the lie detector: first, a competent operator, and second, a proper place in which to conduct the examination.

What should be the background and training of a person who is to conduct polygraph cases? The first essential is that he have a long experience in criminal, business, social, and professional matters. In other words he must know how "the world operates." He must combine a scientific approach to his problems with complete and absolute honesty. The temptation to indulge in wishful thinking in the interpretation of polygrams is often great. The requirement of the operator to interpret the tracing as it actually is, rather than as what he hoped it would be, is basic. When such a person is properly trained in the use of the apparatus he should make an excellent operator. A medical training would often be helpful but is by no means essential.

In what surroundings and under what conditions should a lie detector test be given? When the Michigan State Police started using the polygraph eight years ago, it was frequently taken all over the state and tests run on subjects in county jails, prosecutors' offices, or any vacant corner that seemed to be convenient. It soon became apparent that this was a mistake. The general excitement and confusion present usually made it impossible to run a satisfactory test. Furthermore, there was a distinct tendency on the part of the local police officers to substitute the lie detector for an adequate in-

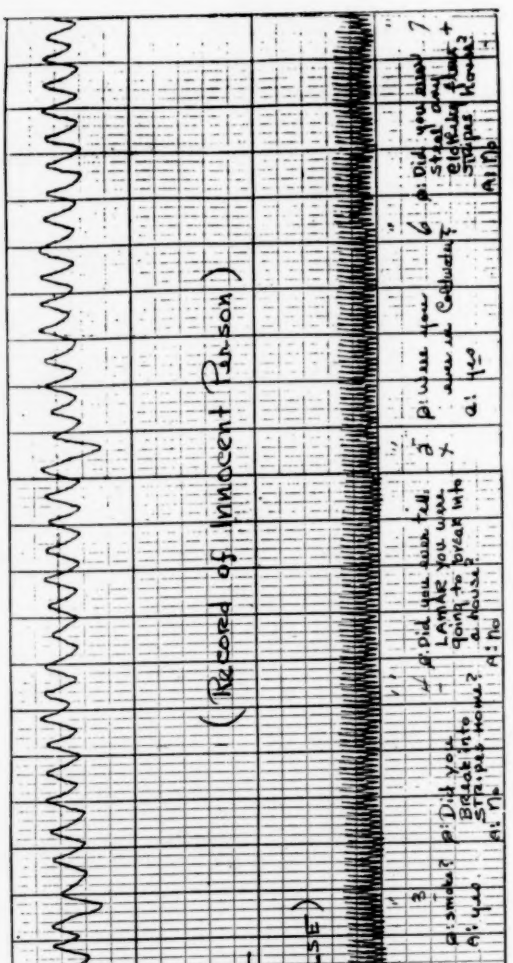


FIG. 2. Record of an innocent person. Note the evenness of blood pressure and respirations.

vestigation from the police angle. To attain any degree of success with the instrument, it is necessary for the operator to have all of the procurable facts with respect to the subject prior to the test. Consequently when suspicion is directed toward an individual in connection with a crime, he should not be subjected to a polygraph examination until the police have completed an exhaustive inquiry into the crime and all related facts.

When it became apparent that this method of conducting an examination was unwise, a special room was constructed at the headquarters post in East Lansing. This room is situated in a quiet section of the building and is sound proof. The walls are decorated, the floor carpeted, comfortable furni-

FIG. 3. Questioning a subject on the lie detector. This shows the new electrodermal response unit attached to the subject's left hand and recording on the middle pen of the instrument. The pneumograph tube is adjusted around the chest and the blood pressure cuff about the right arm. The operator is Detective W. M. Petermann and the subject is posed by Detective Don Berry of the Michigan State Police.

ture has been installed, and everything done to produce a quiet, restful atmosphere without unnecessary fixtures and pictures which will distract the attention of the subject. No officers in uniform are present and the atmosphere is that of a quiet, business-like office.

After reviewing the case with the officers, the operator discusses the matter privately with the subject. The purpose of this is to enable the operator to determine the precise points of conflict between the accused's story and the available evidence. The interview also serves to impress the subject that he will be fairly and civilly treated.

Technic of the Test. By the very nature of the examination the full consent and coöperation of the subject is required. There is no possible way to force a person against his will to submit to an examination. To try to do so would be precisely like attempting to get a satisfactory electrocardiogram on a hostile and recalcitrant individual. Consequently the "third degree" and the lie detector technic represent opposite extremes in criminal interrogation. Any show of bodily violence, threatening, shouting or abusive language preclude any success with this apparatus.

The manner in which the test is conducted is explained to the accused. He is told that he will suffer no pain more than the slight discomfort from the blood pressure cuff about his arm. After the subject has consented to take the test he is taken into the examination room and seated in a straight chair with the apparatus placed behind him. The chair should be equipped with wide arms so that he is perfectly comfortable.

All the questions asked can be answered by a simple "yes" or "no" and the person examined is told to reserve any explanations or qualifications of his answers until the test is completed.

The blood pressure cuff is then applied and the pneumograph tube is adjusted around his chest. The instrument is then started and recordings made of his blood pressure and respirations for a minute or so with no questions being asked. This is to allow the fluctuations in these recordings due to nervousness and anxiety to subside.

The subject is then given a numbers test. This is done by showing him 10 cards numbered from 1 to 10. He is told to select one of the numbers and keep it in his mind but to lie about it when he is asked if that is the number which he has selected. In other words, the subject is to answer "no" when each card is presented to him. The instrument is then started and each card is shown to him slowly and he is asked if that is the card he has selected. Of course he answers "no" to all of these questions including that on the number he has chosen.

The purpose of this test is to see how he reacts under actual questioning and to record his response on the blood pressure and pneumograph tracing when he lies. There is seldom much difficulty in determining the number chosen. This test also has a certain psychological value by impressing upon the subject that it is possible to tell by means of the apparatus when a person is evading the truth.

Following this, he is asked a series of 7 to 10 questions which deal with the crime itself as previously outlined. Questions dealing directly with the crime are interspersed with those of an irrelevant nature. After this test is run the pneumograph tube and the pressure cuff are loosened and a short rest period allowed. The test is then usually repeated once or twice more using different irrelevant questions and placing the pertinent questions in a new order. When these tests are completed the operator usually is convinced that the subject has guilty knowledge of the crime or is entirely innocent. Occasionally, however, the tracings may be of such a nature that the

operator can arrive at no definite conclusion with respect to the guilt or innocence of the suspect.

There are many conditions which may contribute to the making of a tracing upon which no analysis can be made. The subject may be of such a low intellectual caliber that he has no normal responses to questions of guilt or innocence. Such conditions as an uncontrollable emotional reaction or a bad cough may cause considerable difficulty. Organic conditions such as hyperthyroidism, auricular fibrillation or other circulatory diseases will cause difficulty in the interpretation of the tracings. However, it is extremely difficult for a person who is physically normal to run an innocent tracing when he has guilty knowledge of the crime. In fact the harder he tries to, the more pronounced the guilty response is likely to be.

TABLE I

Polygraph Cases Conducted by the Michigan State Police

	Cases	Subjects	Tests	Admissions	Guilty Knowledge	Cleared	No Analysis
1935	92	165	660	41	54	96	15
1936	88	197	591	20	26	43	19
1937	75	107	381	23	44	57	6
1938	127	233	485	69	104	125	4
1939	153	222	354	49	98	111	12
1940	145	235	465	39	75	155	5
1941	121	239	545	33	72	156	11
1942	104	153	473	34	90	60	3
TOTALS	905	1551	3954	308	563	803	75

Results of the Lie Detector Test. The above table shows the results in the use of the polygraph on 1551 subjects over a period of eight years. All of these tests were conducted by either Captain Harold Mulbar or Detective W. M. Petermann. On 563 subjects the instrument gave an indication of guilty knowledge, and in 308 of these cases an admission was obtained at the completion of the test. In 803 cases the subject was cleared as having no guilty knowledge of the crime and in 75 cases the tracings were of such a character that no definite analysis could be made.

In a table of statistics such as shown above there are of course some unknown quantities. One might ask: "How about those subjects on whom the instrument indicated guilty knowledge but from whom no admission was obtained?" Some of these were tried and convicted, others were found not guilty and some were not brought to trial. *However, a much more important fact is that in no case in which the instrument indicated that the subject had guilty knowledge of a crime have later events proved an erroneous conclusion was drawn.*

A similar question might be raised as to the 803 persons who were cleared by the polygraph. In many of these cases the diagnosis of innocence was substantiated by the subsequent confession of other persons. In only

one instance out of this series did the operator conclude that the subject was innocent and later have him confess to the crime. Upon subsequently reviewing the graphs, the operator acknowledged that the indication of guilt was there but the error lay in the interpretation of the tracings.

Interpretation of Cases. Occasionally it happens that a person is innocent of the crime about which he is being questioned but has committed some other offense which disturbs his reactions. For instance, a truck driver was brought in for an examination, who was accused of having stolen funds that he had collected on his delivery route. At the interview prior to the polygraph test he stated that he had a wife and three children. During the test, when questioned with respect to the missing money, he ran a perfectly clear record but showed a great deal of disturbance at the supposedly irrelevant question: "Are you married?" The question was repeated several times with similar results. When questioned with respect to his marriage it developed that he never had been married to the woman with whom he was living and who was the mother of his children. He stated that they always had intended to get married but had neglected to do so until the arrival of the children made it impossible.

During the last eight years that the lie detector has been in use by the Michigan State Police one of the striking advantages it offers is in the clearing of innocent persons. There have been several instances in which the evidence against a person was so strong that he probably would have been convicted had the case gone to trial. Borchard [2] has pointed out that persons who are entirely innocent of wrong doings are occasionally convicted of serious offenses.

Some time ago a salaried employee of the state received his pay check and left to spend the Christmas holidays at a small town in Minnesota. When he returned to Lansing about two weeks later, he reported that he had lost the pay check and requested that another one be issued. In due course a duplicate check was given to him and the matter forgotten. A year later, while he was spending the holidays in the same Minnesota town, the original check was cashed, the only alteration being that it was dated a year later. The cashed voucher returned to Lansing before he got back and when he arrived he was placed under arrest. Of course he protested his innocence, but the fact that the check had been cashed in the same small town in which he was known to be at the time, and in which he had not been for a year, made a strong case against him. Even the endorsement appeared to be his.

On the polygraph this man ran a completely innocent tracing and on the strength of that alone he was released. A few weeks later the truth of the matter became known. The check was lost as he had contended and fell into the hands of a man who had exactly the same name. He held the check for several months, finally altered the date of the year, endorsed and

[2] BORCHARD, EDWIN M.: Convicting the innocent, 1932, Yale University Press, New Haven, Conn.

cashed it. The fact that the state employee happened to be in the town at the same time was pure coincidence. Enough similar experiences have happened to warrant the conviction that the polygraph is a great source of protection to the innocent person.

Likewise, the apparatus is of great aid to the police when the evidence against the suspect is rather weak but the polygraph shows he has guilty knowledge of the crime. Even without an admission it gives an incentive to the police to keep working on the case until more evidence is uncovered. In the experience of the Michigan State Police many cases have been followed through to a successful conclusion, which undoubtedly would have been dropped early in the investigation had not the polygraph convinced the officers they were on the right track.

Status of the Polygraph in Court. Inbau[3] in his recent book "Lie Detection and Criminal Interrogation" has completely covered this topic. Only a few attempts have ever been made to introduce polygraph evidence in court. In Michigan no direct attempt has ever been made to introduce this type of evidence. The occasion seldom arises when such a move is necessary or even desirable. Although the instrument has definitely proved its worth, still there are no set standards for either apparatus or operators. Consequently it is apparent that one fiasco in court might retard the successful use of the device for many years. The lie detector is not an instrument that can be turned on and played like a phonograph. It is simply one useful aid to the criminal interrogator, yet the attempt is usually made to put the polygraph rather than the operator on the stand. In court it is like trying to examine a microscope rather than the pathologist. After more years of experience have been accumulated with this device and standards of technic have been established, it may be possible for trained criminal interrogators to give an opinion as to guilt or innocence partially based on lie detector recordings.

Case Report

On December 1, 1942, a report came to the East Lansing detachment that Mrs. Ellen Pitts was missing and a routine investigation was started. The investigators learned that Mrs. Pitts was married, mother of four children, and a few weeks earlier had deserted her family who lived on a farm near Morrice. The investigation also disclosed that she was keeping company with Harland Nevins, aged 28, married and father of four children, living at 528 South Detroit Street, Lansing Township. Nevins had bought a homemade house-trailer situated in an abandoned clay pit about a half mile from his residence and there had installed Mrs. Pitts.

On being questioned by the police Nevins asserted that he had not seen Mrs. Pitts for a week or so but thought that she had obtained a job as a domestic. The trailer was searched and everything found to be in order.

On December 8 Mrs. Nevins came to the police post and said that her husband, while intoxicated, had told her that he had shot and killed Mrs. Pitts and buried her in a hole that he had dug in the back yard of their home on Detroit Street. She

[3] Inbau, Fred E.: Lie detection and criminal interrogation, 1942, The Williams & Wilkins Co., Baltimore.

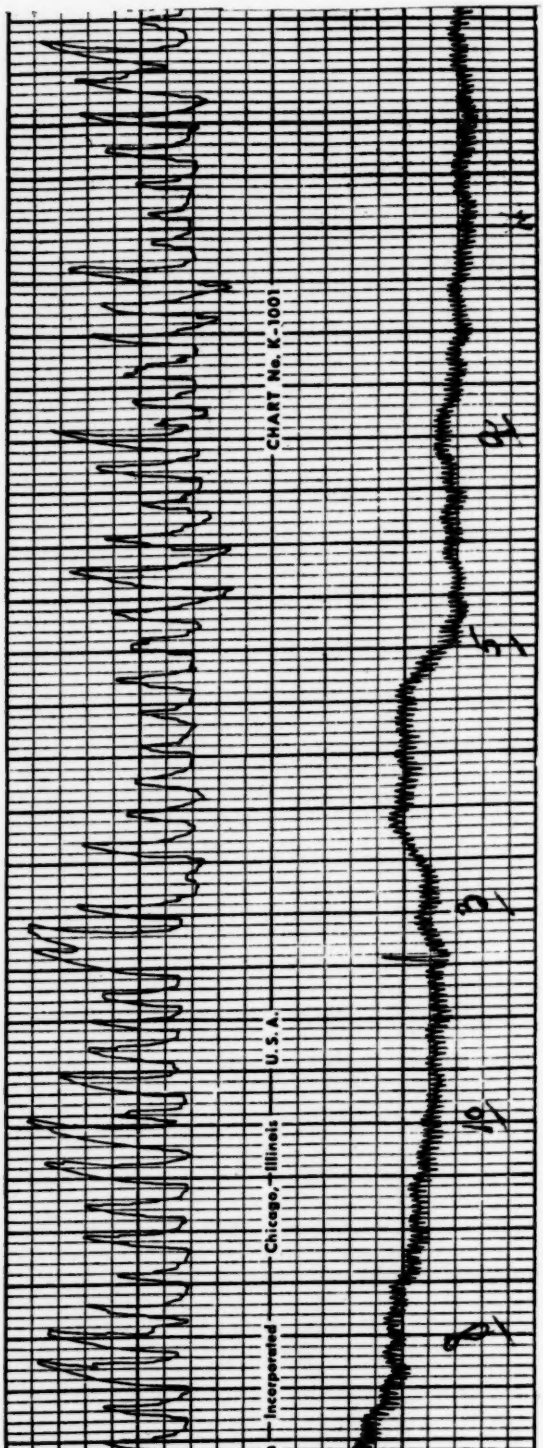


FIG. 4. A portion of the number test on Harland Nevins. The number he had selected was 3. Note the elevation and fall in blood pressure after being questioned on this number and also the suppression of the respirations at this point.

stated that he admitted the shooting occurred on November 21, 1942 and then he had buried her on November 28. Officers went to the Nevins home, and although there was a heavy fall of snow on the ground the grave was located, and on digging down about a foot and a half they found the body of Mrs. Pitts. An autopsy disclosed that she had been shot with a .22 caliber bullet squarely between the eyes. The bullet had fractured the base of the skull and coursed downward toward the back of the neck.

Nevins was arrested but insisted that he did not shoot Mrs. Pitts. His story was that when he went up to the trailer at about 7 p.m. on November 21 he found her dead and didn't know whether someone else had shot her or whether she had committed suicide. He told in great detail how he had picked the body up and kissed it but had finally left it as he had found it. The following day he had returned and cleaned up the blood and laid the body out carefully on the floor. He came nearly every day until the evening of November 28 when he placed the body in the back seat of his car and took it home. He borrowed a shovel and dug a hole in the back yard, and when some neighbors inquired what was going on he replied he was digging a new privy vault. The body was placed in the hole and covered up.

The bullet which had killed Mrs. Pitts had been fired from a rifle owned by Nevins. He said that the rifle had been loaned her some time ago for protection as she lived in a lonely place. In the meantime he had taken the rifle home.

When run on the lie detector, the card test was first employed. Nevins showed a definite reaction to card number 3 which was the one he had selected. When questioned on the shooting of Mrs. Pitts, Nevins showed definite reactions to the questions:

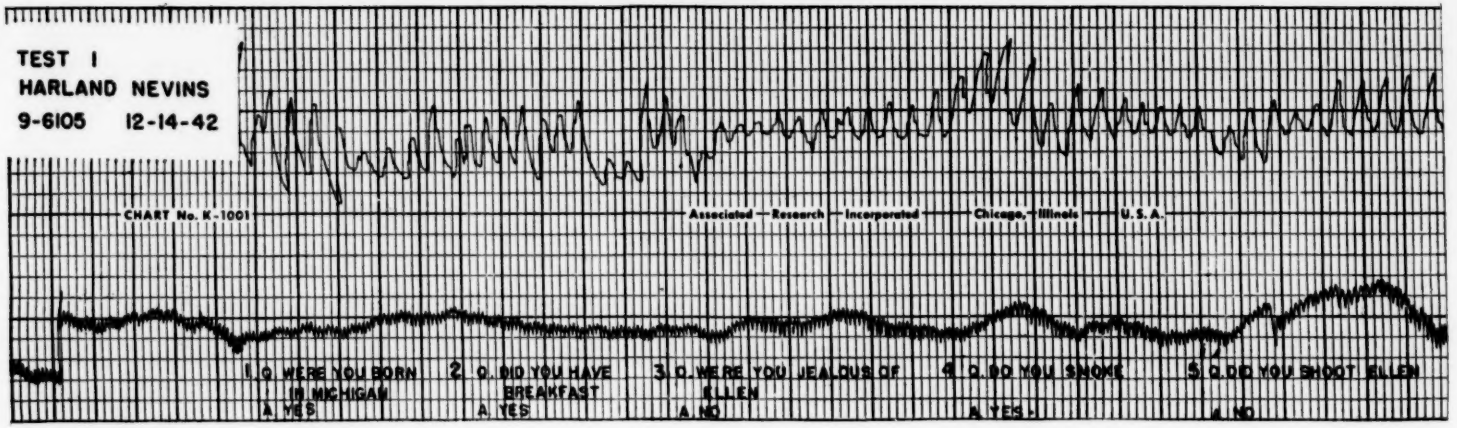
5. Did you shoot Ellen?
7. Did you have an argument with Ellen?
9. Have you lied to any of these questions?

A repetition of the test disclosed identical reactions. Following the polygraph examination, Nevins signed a confession that he had intentionally shot and killed the victim.

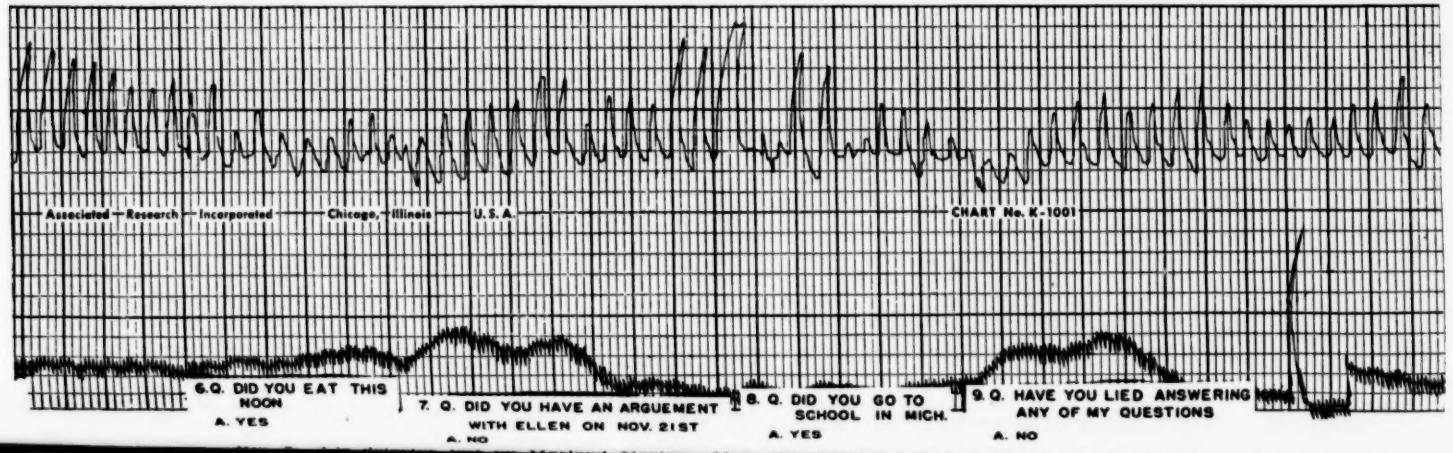
The facts were that Nevins had become jealous because Mrs. Pitts was running around with some other men. On November 21 Nevins went up to the trailer in the morning and picked her up. They had been together practically all day drinking beer in several different taverns. About 6 o'clock in the evening they went back to the trailer and the argument started about Mrs. Pitts' relations with other men and during this Nevins picked up the rifle and shot her while she was sitting on a box. From that point on, the story was substantially as related by Nevins prior to his confession.

This illustrates a rather common type of case. Nevins was distinctly the bully type, often threatened and abused his wife, was a heavy drinker, had been arrested for assault and battery but had never been involved in serious trouble. Had Nevins stuck to his original story it is exceedingly doubtful if he could have been convicted of the murder charge. Picking his chosen number on the card test had definite value. Following the examination Nevins was told that he was not telling the truth with reference to the 3 pertinent questions and it was pointed out to him on the tracings just what his reactions were. As happens frequently in cases of this type, his armor of defense crumpled and the confession followed.

Part A


TEST I
HARLAND NEVINS
9-6105 12-14-42
CHART No. K-1001
Associated — Research — Incorporated — Chicago, — Illinois — U.S.A.
1. Q. WERE YOU BORN IN MICHIGAN
A. YES
2. Q. DID YOU HAVE BREAKFAST
A. YES
3. Q. WERE YOU JEALOUS OF ELLEN
A. NO
4. Q. DO YOU SMOKE
A. YES
5. Q. DID YOU SHOOT ELLEN
A. NO

Part B


Associated — Research — Incorporated — Chicago, — Illinois — U.S.A.
CHART No. K-1001
6. Q. DID YOU EAT THIS NOON
A. YES
7. Q. DID YOU HAVE AN ARGUEMENT WITH ELLEN ON NOV. 21ST
A. NO
8. Q. DID YOU GO TO SCHOOL IN MICH.
A. YES
9. Q. HAVE YOU LIED ANSWERING ANY OF MY QUESTIONS
A. NO

Summary and Conclusions

During the last eight years the Michigan State Police have made use of the lie detector in the investigation of 905 criminal cases. Fifteen hundred fifty-one persons have been tested with the instrument and of these 563 showed guilty knowledge of the crime under investigation. Following the test, 308 of these persons made admissions of guilt, 803 persons were cleared and no analysis was possible in 75 cases.

The lie detector used by this department is an instrument which records changes in blood pressure and respirations. As with all apparatus which records physiological reactions, the interpretation of the findings is the crux of the procedure.

We recognize that the lie detector test has certain pitfalls, and every precaution must be taken to guard against errors of interpretation. As far as it is possible to check the results, the device and technic have shown a high degree of accuracy. By means of this technic many persons have been induced to confess to the commission of serious crimes, who without the use of the lie detector, undoubtedly would never have been convicted. Likewise, in several instances persons against whom there was strong evidence of guilt have been cleared by the lie detector and their innocence later substantiated. In the opinion of the Michigan State Police, interrogation by means of the lie detector provides a scientific, humane and highly accurate adjunct to criminal investigation.

LEGAL–MEDICAL ASPECTS OF BLOOD TESTS TO DETERMINE INTOXICATION *

By MASON LADD † and ROBERT B. GIBSON,‡ *Iowa City, Iowa*

THE development and use of chemical tests to determine intoxication has been due in a large measure to the activity of the National Safety Council in its effort to control the vast number of traffic accidents which have been caused by drunken driving. Its interest in national safety has resulted in active work to seek out the causes of injury and death arising from motor vehicle accidents with a view of preventing them. In this age in which practically all members of American society operate motor vehicles it is inevitable that many accidents occur both on open highways, which present opportunities for high speed, and in congested areas, where ordinary driving of a motor vehicle requires skill and alertness of mind. It is the interest in public safety that has caused legislatures to enact statutes making the operation of a motor vehicle while intoxicated a crime. Fear of criminal prosecution is counted upon to control or at least to retard drivers from operating motor vehicles when under the influence of intoxication. Fear of the law in the abstract, however, is but slight if the prosecution under the law cannot result in conviction of those guilty of the offense. Every public prosecutor knows the difficulty in trying this kind of case. The defense interposed always has some plausible excuse, either that the accused had liquor on his breath but had not imbibed excessively, or that the stupor and other objective manifestations of drunkenness were produced by shock, by the injury which the accused himself may have suffered, or by some other cause than intoxication. In some instances it is undoubtedly true that these are the causes and that an innocent person, because of his conduct and appearance, is facing prosecution. To determine the truth or falsity of the defense and the correctness of the charge against the accused, chemical fluid tests can solve the issue accurately in many cases. These tests should not stand in place of the usual evidence introduced as proof, but should be used as supplementary evidence. When the alcoholic content in body fluid is sufficiently high, this scientific test is unquestionably the most reliable method of determining intoxication. When properly used in the trial it should be most effective in bringing about just results.

The best method to control drunken driving is public education, making individuals in society aware of the danger to others and to themselves. However, to the extent that fear of the criminal law and of peace officers has a tendency to control behavior in society, success in the prosecution of criminal offenses is even more important than simply enacting the criminal

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law upon the statute books. Therefore, a more effective means of establishing guilt of the accused in criminal cases involving intoxication would substantially aid in keeping the drunken driver off the highway. From the standpoint of the individual case on trial, whether a criminal prosecution or a civil suit for damages, this recent method of determining intoxication should be of great assistance to courts and triers of fact in obtaining a just decision. Realizing the importance of the chemical test to determine intoxication, the National Safety Council has published and collected the works of numerous scientists and legal scholars pertaining to the subject and has used this material to inform law enforcing agencies of the possibilities for using this test and to inform the public of its value. Through this Council, in coöperation with state safety councils, legislative enactments permitting the use of these tests in evidence have been obtained. Today there are modern statutes on the subject in Indiana, New York, Maine and Oregon.[1] In many states the courts have admitted these tests without the aid of statutes and although legislation gives legal sanction to this procedure, similar results can be accomplished through the decisions of forward-looking courts. It is proposed in the following discussion to present concisely the significant medical and legal problems involved in the use of the body fluid test to determine intoxication.[2]

The determination of the alcohol content of the blood for evidence of intoxication is not a recent procedure. Grehant in the nineties studied the blood alcohol level after fatal doses of alcohol administered to dogs; later (with Nicloux), using more delicate analytical tests, he confirmed his earlier work. Nicloux suggested the medico-legal application and urged the adoption of such procedure. Widmark's correlation of blood alcohol levels and intoxication in man was undertaken previous to and during World War I. The test became mandatory in 1934 in Sweden largely through his influence. Blood alcohol tests for intoxication were ordered in Germany (1936) after a preliminary period of actual trial, and in Denmark, France and Switzerland. Blood and urine alcohol tests for intoxication are recognized now in our lower courts, and blood and urine alcohol levels defining intoxication are in the statutes in some states.

The amount of alcohol in the blood is the best measure of intoxication, as shown by many reports and data on many thousands of cases in Europe and in this country.[3] Urine alcohol values commonly exceed those of the blood (1.35 : 1) and individual variations are found. The urine test is sig-

[1] Burns, Indiana Statutes Annotated (1940) Tit. 47 § 2003; McKinney's Consolidated Laws of New York (1942) § 70 (5); Laws of Maine (1939) Ch. 273; Oregon Laws (1941) Ch. 430.

[2] In 1939 these writers of the present article wrote a more extensive paper considering this subject in greater detail. See Ladd and Gibson, The Medico-Legal Aspects of the Blood Test to Determine Intoxication, 24 Iowa Law Review 191–267. The present article includes discussion and references showing later developments.

[3] See note 2 supra. Later reports to the same effect include Jetter, W. W.: The chemical and clinical diagnosis of acute alcoholism, New England Jr. Med., 1939, cci, 1019, and Bavis, D. F.: 145 drunken drivers—a blood and urine alcohol study, Jr. Lab. and Clin. Med., 1940, xxv, 823.

nificant when the critical alcohol content indicative of intoxication is set at a higher level.

Figures for blood (or urine) alcohol content are to be presented as only a part of the proof of intoxication. Dependence on the blood alcohol test alone or too much emphasis on its conclusiveness will weaken the prosecution. For example, a physician may make a diagnosis of and estimate the severity of a diabetic or uremic condition by quantitative blood tests for glucose or urea alone; but the patient's history, physical examination and other laboratory reports usually come first and the quantitative analyses on the blood complete the picture. In endeavoring to establish (or rule out) a state of alcoholic intoxication, all of the information to this effect should be presented.

The signs and symptoms of intoxication then are important whether noted by the physician or others. The effect of alcohol is principally on the nervous system. It produces mental disturbance, neuromuscular incoordination, and in large amounts narcosis. Deaths from acute alcoholic poisoning are not uncommon. There will be an odor of alcohol on the breath or in the vomitus, a furred tongue, salivation and intermittent hiccup. Irregularity of behavior is outstanding, i.e., insolence, use of abusive language, loquacity, excitement, sullenness, disorder of dress. There is loss or confusion of memory especially concerning recent events and impaired appreciation of time. Speech is hesitant and thick and articulation is impaired. Abnormality of the pupils (various forms), suffusion of the conjunctiva and convergent squint (esophoria) may be noted. The face is flushed. There is tremor. Errors of neuromuscular coördination and of orientation occur as shown by the manner of walking, turning sharply, sitting down and getting up, picking up small articles from the floor, and swaying or falling when standing with the feet together and closing the eyes (Romberg sign). The above symptoms will vary with individuals and in proportion to the quantity of alcohol ingested. With large amounts taken, the individual passes into the paralytic stage. The respiration is slow and stertorous, the pulse weak, the skin cold and cyanotic, the pupils dilated, the reflexes are lost and the body temperature below normal. If large amounts are taken on an empty stomach, the paralytic symptoms may be manifested in a short time.

The application of legal technics involved in the introduction of the blood and urine alcohol test to establish intoxication will be described. However, some discussion of blood alcohol levels in relation to intoxication seems desirable at this point.

A blood alcohol figure of 150 milligrams per 100 cubic centimeters of blood (or 0.150 per cent by weight) [4] is considered indicative of intoxication because at that level practically everyone shows sufficient deterioration of

[4] Reports on body fluid analyses generally are expressed in clinical reports as milligrams per 100 cubic centimeters or simply mg. per cent. In states where the blood or urine alcohol content defining intoxication is included in the statutes, it would be best to use such terminology in the trials (usually per cent by weight). Milligrams per cubic centimeter (mg. per c.c.) are often used. Breath alcohol is in direct relation to that of the blood and is expressed in terms of blood alcohol concentration as above.

judgment and interference with neuromuscular coördination to be a menace to himself and to others. A few individuals are intoxicated at levels not much over 50 mg. per cent. Others hardly appear intoxicated at 150 mg. per cent or more, though behavior and clinical tests will demonstrate that they are affected.

The following correlation (from the literature and our own experience) of blood and urine alcohol levels, quantity of liquor consumed, and stage of intoxication has been useful in court. Stages 3, 4 and 5 necessarily overlap.

1. Normal, blood and urine alcohol 5 to 15 mg. per cent.
2. Social stage, blood up to 50 mg., urine 10 to 60 mg. per cent; two glasses or bottles of beer, or one highball or cocktail (two when taken with chips, crackers, etc.). Effects are slight; feeling of bodily warmth and well being, mild euphoria, behavior tests normal.
3. Preintoxication to intoxication stage (stimulation stage), blood 50 to 150 mg., urine 60 to 200 mg. per cent; two to eight bottles of beer or two to four highballs. Release of social inhibitions, emotional instability, slowed response to stimuli and neuromuscular incoördination. Some individuals are easily recognized as intoxicated at 90 mg., others seemingly are not much affected at 150 mg. per cent in the blood, but judgment is impaired and their control required for quick responses is impaired.
4. Intoxication stage (confused stage), blood 150 to 300 mg., urine 200 to 400 mg. per cent; one half to one pint of whiskey over a short drinking period. Symptoms and behavior typical for intoxication.
5. Stuporous stage, blood 300 to 400 mg., urine 375 to 500 mg. per cent; one pint or more of whiskey. Stupor, responds only to strong stimuli.
6. Paralytic stage, coma or narcosis, blood 400 to 600 mg. per cent. Cannot be aroused, depressed reflexes, subnormal temperature, stertorous breathing; possible death.

Failure to take certain precautions in the obtaining and subsequent handling of blood and urine specimens may lead to exclusion of the fluid test as evidence. If possible, consent of the person in question for the taking of blood or urine specimens for the alcohol test should be obtained in the presence of witnesses. Blood should be drawn or urine collected as soon as possible, as alcohol is oxidized in the body and the blood level decreases about 20 mg. per cent an hour.[5] The blood should be taken in the presence of witnesses by a police surgeon or a physician or by a nurse or laboratory technician (if not prohibited by statute); urine samples may be collected by a police officer—an advantage in employing urine for the test. The syringe and needle should be dry or steam sterilized; only bichloride solution or cake soap and water (never alcohol) should be used in disinfecting the skin. The

[5] In New York the specimen must be taken within two hours of the time of arrest.

container into which the specimen is discharged should be sealed and labeled with the name of the donor, the date and hour obtained, the physician's name, and the names or initials of the witnesses.[6] The physician should make and record the usual neurological (and behavior) tests and form an opinion as to intoxication. He should avoid establishing a physician-patient relation as this may lead to the exclusion of his testimony and of the evidence of the blood alcohol test in the trial.

Continuity of possession of the blood or urine specimen until introduced as an exhibit in the trial must be assured. If convenient, the physician or other person who took the specimen from the prisoner may place it in the hands of the laboratory director or of the analyst, or it may be brought to the laboratory by a police officer or deputy who received it from the hands of the physician. A notation of the date, and from whom and by whom it was received should be made. Specimens may be mailed, preferably special delivery or registered; however, specimens received in the course of ordinary delivery of the United States mail are accepted by the courts. A part of the blood or urine necessarily will be used up in the analysis; the container with the remainder of the specimen therein should be sealed and kept under lock and key by the laboratory director or the analyst until delivered to the county attorney or on his written order or until the case has been disposed of legally.

A great responsibility is put upon the chemist or technician who actually determines the alcohol content of the specimen. His efficiency should have been proved by actual determinations of known amounts of alcohol added to blood or urine and by his ability to check with the figures obtained by experienced analysts on specimens brought to the laboratory. The analytical method should be one recognized as reliable by biochemists and clinical pathologists and the detailed procedure available in a standard text or journal. When the analysis is done by a technician, it should be at the direction and under the supervision of the laboratory director, not only to insure against technical error but in order that either person may testify as to the alcohol content found. The test should be made in duplicate and the results should check. If the blood specimen is not sufficient in quantity for duplicate determination (including the distillation), the analysis is, nevertheless, admissible and is valuable as proof when in accord with other evidence of intoxication. Analytical notes should be kept and filed. Analyses should be made with reasonable promptness. Results may be telegraphed, telephoned or police-radioed to the police station, sheriff or county attorney if requested. A written report should follow for their records.

In presenting witnesses and giving testimony, a chronological order of obtaining the specimen and carrying the test through to its conclusion is best followed. Ordinarily, the events involved in the litigation will have been presented in the trial by other witnesses. Some of these, after testifying

[6] It may be advisable to obtain a duplicate specimen of the blood when drawing it and to seal and retain it for use should the defense request a specimen for a check test.

as to other matters they have perceived,[7] will give testimony as to their connection with the blood test. The technical evidence pertaining to the test constitutes a distinct and somewhat separate part of the total testimony in the case. The first witnesses to testify in this part should be those participating in taking the specimen. The physician who has taken the blood sample should testify as to obtaining the consent of the party, if required, the time of drawing the specimen, and the procedure and the precautions taken to avoid the introducing of foreign material which might influence the subsequent analysis. He should then identify the container (with the residue of the specimen) offered as an exhibit by the prosecution. He should testify when and to whom the specimen was delivered and mailed. This witness should not be questioned extensively in direct examination, if at all, on the consequences of the test. His function is to show that he has a clean, safe blood specimen and that it was transmitted properly for chemical analysis. He may not be a real expert upon the analysis of the blood (or urine) nor familiar with the literature on the results of the blood alcohol test and could be confused easily by cross examination with respect to the test. If gone into with him on direct examination, he is exposed to all of the fire of cross examination and may ruin a case before the expert on the subject takes the stand. If an intern, a nurse or technician (or on occasion a police officer for urine) has drawn the specimen, such witness should be put on the stand and should testify as above.

The analyst very commonly is the expert as well, though these two functions at times might be separated with different witnesses giving the testimony. In either event testimony pertaining to the analysis should be given first and with meticulous care. The analyst should give qualifying testimony as to his training and experience, especially with reference to the determination of the alcohol content of blood and urine. He should identify the container and contents (exhibit—) and state from whom and the time when he received it. He should name the method of analysis,[8] outline briefly the procedure and precautions to assure accuracy, the quantity of alcohol found and the subsequent disposal of the container and remaining specimen.

[7] The Iowa State Highway Patrol and the local police have shown excellent judgment in their estimation of acute alcoholism. In a period from February 1, 1939 to July 1, 1941, 336 tests on blood alcohols were made at the University Hospital. There were 4.4 per cent of these containing less than 50 mg. per cent of alcohol, and the specimens were sent in for the establishment of innocence and usually on the individuals' own initiative. The remaining 95.6 per cent were distributed as follows: 50–99 mg., 1.5 per cent; 100–149 mg., 6.2 per cent; 150–199 mg., 19.3 per cent; 200–249 mg., 29.2 per cent; 250–299 mg., 25.0 per cent; 300–349 mg., 9.2 per cent; 350–399 mg., 3.2 per cent, and 400–449 mg., 1.2 per cent.

[8] See Ladd and Gibson *op. cit. supra* note 2, pp. 210–212 for a brief description of the analytical methods for blood and urine alcohol. Also Levine, H., and Bodansky, M.: Determination of alcohol in tissue and body fluids: summary of practical procedures for the pathological laboratory, Am. Jr. Clin. Path., Tech. Suppl., 1939, iii, 159; A simple and accurate method for the determination of alcohol in body fluid, Am. Jr. Clin. Path., 1940, iv, 103; and Johnston, G. W., and Gibson, R. B.: A distilling apparatus and a procedure for the determination of alcohol in blood and urine, Jr. Lab. and Clin. Med., 1940, xxvi, 399. The accuracy of the breath test as carried out has recently been questioned by Haggard, H. W., Greenberg, L. A., Miller, D. P., and Carrol, R. P.: The alcohol of the lung air as an index of alcohol in the blood, Jr. Lab. and Clin. Med., 1941, xxvi, 1527.

The effect of the alcohol content of the blood should be the last testimony offered in the blood test evidence. This witness should qualify truly as an expert if the testimony is to carry weight with the triers of fact. Some statutes provide that a given percentage of alcohol in the blood (or urine) creates prima facie evidence of intoxication. In other states this effect must come through the opinion testimony of the expert, and in all cases this is desirable to make the testimony effective. Experience has shown that it is upon this problem that the greatest amount of cross examination is developed. The expert must be fully qualified, well read in the literature of the subject, and it is desirable that he should have had first hand experience in making analyses and comparisons of blood alcohol content in relation to intoxication. He may be a clinical pathologist, a physician who has made a special study, a pharmacologist, biochemist or chemist who has the foregoing qualifications. The validity of the test is recognized and its application sufficiently well known that the direct examination may be brief. After being duly qualified he should be questioned further as follows:

Q.—From your study of the literature and your own observation and experience, are you able to correlate the amount of alcohol or alcoholic beverage consumed with a resulting blood alcohol level? [9]

Q.—Would you express your opinion as to how much beer (wine, or whiskey) an individual of average weight must drink over a period of one to two hours to bring the blood (or urine) alcohol to — mg. of alcohol per 100 c.c.?

Q.—Is there a recognized correlation between blood (or urine) alcohol levels and intoxication from alcohol? [10]

Q.—From your own study and experience would you say that an individual with a blood (or urine) content of alcohol of — mg. per 100 c.c. of blood (or urine) was intoxicated?

Q.—Would you consider an individual with a blood (or urine) content of alcohol of — mg. per cent to have been intoxicated at a time — hours previous to the time the specimen was obtained? [11]

Should the prosecutor desire to present to the jury more information regarding the test and its reliability, the following questions may be asked the witness prior to those suggested above. Like information will almost certainly be sought in the cross examination.[12]

[9] Roughly 1 c.c. of alcohol per kilo (2.2 lbs.) produces a blood alcohol level of about 100 mg. per cent; 2 c.c. nearly 200 mg. per cent, etc. Two c.c. of whiskey are equivalent to one c.c. of alcohol. One bottle (12 oz.) of beer is about equal in alcohol content to one oz. of whiskey.

[10] Ladd and Gibson, *op. cit. supra* note 2, pp. 262–267.

[11] The time is the period between finding the person in question in apparent intoxication (or the time of an accident or other event) and the taking of the specimen. As blood alcohol is reduced through destruction in the body 15 to 20 mg. per hour, such an estimate is feasible if the individual has taken no more liquor during the period.

[12] An excellent review of the metabolism and pharmacology of alcohol may be found in Sollman, T.: A manual of pharmacology, 6th Edition, 1942, W. B. Saunders and Co., Philadelphia and London.

Q.—Is alcohol normally present in the body (blood or urine) and in what quantity? Are there other substances in the blood or urine which will disclose similar results to this test? What happens to alcohol after it is taken into the body? How much is excreted in the breath and urine? How much alcohol in drops per ounce is — mg. per cent? How does alcohol produce intoxication? What is the effect of food taken with intoxicating beverages? Are there not individuals who can have a blood alcohol level above 150 mg. per cent who are not intoxicated? What is tolerance to alcohol?[13] How do you calculate the amount of alcohol in the blood from the amount ingested? What other methods are used for the test other than the one employed? Is not the spinal fluid test better than the blood test? What is the National Safety Council? What is the basis for the 150 mg. blood alcohol level as indicative of intoxication? The witness also should be familiar with such controversial literature as may be brought up in the cross examination.

Thus far the methods in taking fluid tests to determine intoxication, their reliability as evidence, and the technics for proper presentation in court have been considered, but there are many questions purely legal in character which are all important to lawyers and of interest to the medical profession. To those not familiar with the legal issues it is somewhat of a mystery why the test should not be given to all persons having the appearance of intoxication when the question of their intoxication is involved in possible criminal behavior. The results of the test would serve to protect the innocent as well as to convict the guilty. It would seem that for good law enforcement and in the interest of public safety there should not be legal obstacles to prevent free use of the test. Indeed, to protect the unconscious person who is not intoxicated but appears to be, his best interests would be served by having the test taken without his consent. Most of the problems have arisen, however, as to the fact of consent, and at the present, at least, most courts seem to require that a person must consent to the fluid test as a prerequisite to its use in evidence. This requirement, in turn, raises the question of what constitutes consent by one charged with drunkenness. These problems will be considered separately. The first issue of the acceptance of the test in evidence as scientific proof of intoxication now may be safely regarded as settled, as in the courts of some 32 states fluid test evidence has been admitted as proof of intoxication. This accords with the position taken both by the National Safety Council and the American Medical Association.[14]

[13] The question of tolerance required further investigation. At present it is taken care of by emphasis on the presentation of definite evidence of intoxication in addition to that of the blood test when the blood alcohol level is between 50 and 150 mg. per cent. Above 150 mg. the individual is considered drunk irrespective of idiosyncrasy or tolerance. A compensation for normal muscle-sense incoördination may be achieved by slowing the movements and using visual sense aid in controlling these. Newman and others have shown that the effects of alcohol are much more pronounced earlier when the blood alcohol content is maintained at a level for some hours. There seems to be a definite amelioration of the symptoms later, Newman, H., and Abrahamson, M.: Relation of alcohol concentration to intoxication, Proc. Soc. Exper. Biol. and Med., 1941, xlviii, 509.

[14] The Committee to Study Problems of Motor Vehicle Accidents of the A.M.A., Jr. Am. Med. Assoc., 1942, cxix, 653, reiterates its former recommendation that the percentage of

The use of body fluid to determine intoxication at the outset faces two constitutional problems. In the Federal Constitution and in the Constitutions of all states except Iowa and New Jersey there is a provision against compulsory self-incrimination. The Fifth Amendment of the Federal Constitution is representative of these sections and provides that in any criminal case no person shall be compelled to be a witness against himself. In Iowa there is a statute to the same effect. In every case that has come before the courts in which the body fluid test has been taken without consent of the accused the defense has sought to exclude the evidence on the ground that it violates the privilege against self-incrimination. If this position is sustained by the Supreme Court of the various states, it means that use of the body fluid test cannot be made except when consent is given. Obviously the accused who knows he is intoxicated is not likely to give his consent, and the benefit of this type of evidence is lost in the cases in which it is most needed. In the cases in which the prosecution claims that the accused did consent, there will always be this question of fact to be determined as a condition precedent to the admission of this type of evidence. According to the more sound view of interpretation of the privilege against self-incrimination, it has no relationship to this kind of a problem. In the historical development of the privilege it was only used to prevent compelling an accused person to give incriminating testimony, that is, verbal or written testimony against himself.[15]

In numerous instances compulsory disclosures not verbally communicated and yet very damaging in their effect have been admitted in evidence against the defense that they were self-incriminating.[16] The forcible taking of shoes from the accused for a comparison with tracks made at the scene of the crime is admissible.[17] Except in Georgia [18] it is generally held that the accused may be forced to place his foot or shoe into the disputed print, without violation of the privilege.[19] Results of a physical examination of sexual organs of the accused made forcibly by a physician to determine pregnancy or disease are received in evidence in face of the privilege,[20] although

alcohol in the blood is a reliable index of the degree of intoxication, especially when considered along with the external symptoms of intoxication:

1. Below 0.05 per cent alcohol in the blood: no influence by alcohol within the meaning of the law;

2. Between 0.05 and 0.15 per cent, a liberal wide zone; alcoholic influence usually is present, but courts of law are advised to consider the behavior of the individual and circumstances leading to the arrest in making their decision;

3. 0.15 per cent: definite evidence of "under the influence," since every individual with this concentration would have lost to a measurable extent some of that clearness of intellect and control of himself that he would normally possess.

[15] 8 Wigmore 3d ed. §§ 2250–2252; Ladd and Gibson, *op. cit. supra* note 2, pp. 225–232.

[16] Inbau, Self-Incrimination—What an Accused Person May Be Compelled to Do (1937) 28 J. Crim. L. 261; Ladd and Gibson, *op. cit. supra* note 2, pp. 232–241.

[17] *Biggs v. State,* 201 Ind. 200, 167 N.E. 129 (1929) and extensive note in 64 A.L.R. 1085.

[18] *Day v. State,* 63 Ga. 668 (1879); *Elden v. State,* 143 Ga. 363, 85 S.E. 97 (1915).

[19] Note 2, *supra.*

[20] *Villaflor v. Summers,* 41 Phil. Is. 62 (1920). See also: *State v. Eccles,* 205 N.C. 825, 172 SE 415 (1935) Contra: *People v. McCoy,* 45 How. Prac. (NY) 216 (1873). But in *People v. Sallow,* 100 Misc. 447, 450, 165 N. Y. Sup. 915, 921, 36 N. Y. Crim. 27, 37 the court said: "The ruling in the case of *People v. McCoy* in so far as it held that evidence by a

one state in an earlier case held that taking a blood test to determine disease could not be made under compulsion.[21] This case is out of harmony with the better view today. The theory for admissibility is pointed out in the case of *State v. Graham* in which the court stated: "Confessions which are not voluntary but are made either under fear of punishment if they are not made, or in the hope of escaping punishment if they are made, are not received as evidence, because experience shows that they are liable to be influenced by those motives, and cannot be relied on as guides to the truth. But this objection will not apply to evidence of the sort before us. No fears or hopes of the prisoner could produce the resemblance of his track to that found in the corn field." [22] In the Philippine case of *Villaflor v. Summers,* the court states: "No accused person should be afraid to use any method which will tend to establish the truth. . . . No evidence of physical facts can for any substantial reason be held to be detrimental to the accused except in so far as truth is to be avoided in order to acquit a guilty person." [23] Not infrequently courts require the accused to change his wearing apparel and to don an article worn by the one who committed the crime to aid in identification, although the process is objected to under the self-incrimination doctrine.[24] *Shaffer v.* the *United States* is an interesting case in which evidence of the photograph of the accused, taken immediately after the crime, without his consent, was held admissible for the use of a witness to identify him, he having grown a full beard.[25] The dicta, in the case of *Johnson v. Commonwealth,* approved requiring the accused to speak for the purpose of identifying his voice, and, although without the Supreme Court decisions in point, the practice is commonly used.[26] Physical examinations to determine the sanity of an accused person are not contrary to the privilege.[27] Some courts have held that handwriting demanded by an officer after arrest, whether objected to or not, is admissible evidence and not within the privilege against self-incrimination.[28] Justice Holmes, in the case of *Holt v. State,* summarized the correct principle well, stating: "But the prohibition of compelling a man in a criminal court to be a witness against himself is a prohibition of the use of physical or moral compulsion to exhort communication from him, not an exclusion of his body as evidence when it may be material. . . . When he is exhibited, whether voluntarily or by order, and even if the order goes too far, the evidence if material is competent." [29]

compulsory physical examination of the defendant was not admissible in evidence must be overruled by the authorities cited."

[21] *State v. Height,* 117 Ia. 650, 91 N.W. 935 (1902). See criticism Ladd and Gibson, *op. cit. supra* note 2, pp. 215–225.

[22] 74 N.C. 646, 647 (1876).

[23] 41 Phil. Is. 62, 69 (1920).

[24] *Holt v. United States,* 218 U.S. 245, 252 (1910); *State v. Aschoa,* 49 Nev. 194, 242 Pac. 582 (1926).

[25] 196 U.S. 639 (1904).

[26] 115 Pa. St. R. 369, 9 Atl. 78 (1887).

[27] *Commonwealth v. Miller,* 289 Mass. 441, 194 N.E. 463 (1935); *Jessner v. State,* 202 Wis. 184, 231 N.W. 634 (1930).

[28] *Sprouse v. Commonwealth,* 81 Va. 374 (1886); *State v. Owens,* 167 Wash. 283, 9 Pac. (2d) 90 (1932).

[29] *Holt v. United States,* 218 U.S. 245 (1910).

There has been but one court to date which has refused to admit the blood test to determine intoxication obtained without the consent of the accused because it was a denial of the privilege against self-incrimination. A number of courts have talked about it in their comments but have decided the case upon other grounds. In the Texas case of *Apodaca v. State* the court definitely held that taking the test under such circumstances was a denial of the constitutional privilege.[30] This opinion is reactionary from many angles. It even went so far as to deny officers the right to compel the accused to walk and make sudden turns, to hold out his hand, and to give the usual tests employed to determine intoxication from objective observations. This Texas case does not discuss the theory of the law nor its history. If carried to its logical conclusion it would no longer permit officers to compel a person under arrest to submit to fingerprinting [31] or to the taking of a photograph. The Texas, Cincinnati and Washington Law Reviews, in commenting upon the case, reached the conclusion that it was wrong and that it followed the old rule of compulsion alone.[32] In the three cases in which the matter has been discussed by the Iowa Supreme Court a more hopeful attitude is indicated.[33] The Court has found some other means of deciding the issue than upon the point of the necessity of consent. In the most recent case of *State v. Benson* Chief Justice Miller wrote an illuminating opinion holding that where the accused refused to permit the test to be taken when requested by the police officer, the prosecution could comment upon it and the jury could consider it in the nature of an admission.[34] This court applied the rule that the prosecution may comment about the accused's failure to testify to the situation in which the accused had refused to consent to a blood test. The Ohio case of *State v. Gatton* had the problem squarely before it, and the court held that consent was not necessary for the taking of a body fluid test and that compulsion was not a denial of the privilege against self-incrimination.[35] In most of the cases that have come before Appellate Courts over the country there has been sufficient evidence of consent on the part of the accused to make it unnecessary for the court to decide the issue of whether the constitutional provision applied.[36] The American Law Institute, in its Model Code of Evidence Rule 205, definitely takes the position that it is not a denial of the privilege to compel an accused person to submit his body to examination for the purpose of discovering or recording his corporal features and other identifying characteristics or his physical or mental condition or to furnish

[30] 140 Tex. Cr. R. 593, 146 S.W. (2d) 381 (1940).

[31] The legality of taking Bertillon measurements and fingerprints is discussed in *United States v. Kelly*, 55 Fed. (2d) 67, 83 A.L.R. 122 (C.C.A. 2d, 1932) and note.

[32] 19 Tex. L. Rev. 463 (1941); 15 Cincinnati L. Rev. 344 (1941); 26 Wash. L. Rev. 435 (1941).

[33] *State v. Morkrid*, 286 N.W. 412 (Iowa 1939); *State v. Weltha*, 228 Ia. 519, 292 N.W. 148 (1940); *State v. Benson*, 230 Ia. 1168, 300 N.W. 275 (1941). The last case written by Chief Justice Miller takes a much more enlightened position than the earlier cases.

[34] Id.

[35] 60 Ohio App. 192, 20 N.E. (2d) 265 (1937).

[36] *State v. Cash*, 219 N.C. 818, 15 S.E. (2d) 277 (1941); *Commonwealth v. Capalbo*, 308 Mass. 376, 32 N.E. (2d) 225 (1941).

or to permit the taking of samples of body fluids or substances for analysis.[36a] This forward-looking position taken by the American Law Institute is bound to have a significant influence in molding the law of the future. A great amount of literature and many decisions of the Courts exist dealing with the subject of the privilege against self-incrimination.[37] It is a significant phase of constitutional law and the law of evidence. The original or orthodox view and that taken by modern thinkers upon the subject are in accord that the privilege does not deal with anything other than testimonial communication. Some state courts have enlarged upon this beyond any intended constitutional limitations without thought of the objective sought to be accomplished by the privilege. Logically or historically the privilege should not be extended to the body fluid cases any more than to the fingerprint cases or other objective manifestations which could not be altered as a result of their compulsory taking. Verbal testimony might be subject to change with the influence of compulsion upon the accused, but fingerprints or body fluids would be the same whether taken with or without consent.

Another problem that has caused some courts difficulty upon the constitutional issue is whether the taking without consent of a body fluid from a person accused of crime is an unlawful search and seizure. Here again the few courts that have taken the position establishing the illegality of such procedure have really built into this constitutional inhibition something of their own making unsupported historically or upon any logical basis.[38] This application has but such slight recognition today that it is unnecessary here to consider it at length. The Fourth Amendment of the Federal Constitution and similar provisions in state constitutions relate to unlawful search and seizure of a person's home or of the person for chattels or papers which he might possess. The doctrine has no application to the physical examination of the person for purposes of identification and should not apply to the compulsory taking of body fluids for testing purposes.

There is another doctrine involved which has not been very fully developed and which may give rise to some difficulty. In one case relating to the taking of blood samples on the issue of paternity the court developed the thought that it was a denial of due process of law and an invasion of the right of privacy of the person. This New Jersey case of *Bednarik v. Bednarik* should have some consideration here because of its possible relationship to the blood test to determine intoxication.[39] It was an action for divorce on the ground of adultery. The plaintiff's husband made an application for an order to compel a blood test of him, his wife and his child to determine whether or not he was the father of the child. A New Jersey statute au-

[36a] See in this Symposium Series: Morgan: Suggested remedy for obstructions to expert testimony by rules of evidence, 2 Clinics (April, 1943); Chicago Law Rev.—(April, 1943).

[37] Note 2, *supra.*

[38] 8 Wigmore, *op. cit., supra* note 15, §§ 2175–2183; Ladd and Gibson, *op. cit, supra* note 2, pp. 215–218.

[39] 18 N. J. Misc. 633, 16 Atl. (2d) 80 (1940).

thorized the use of blood grouping tests to determine paternity. It was held that to grant the petition would amount to an unconstitutional invasion of the right of personal privacy of the defendant and the child. The court commented as follows:

> "To subject a person against his will to a blood test is an assault and battery, and clearly an invasion of his personal privacy. It involves the sticking of a surgical needle into his body. Perhaps the operation is harmless in the great majority of cases, although the risk of infection is always present. But if we admit such an encroachment upon the personal immunity of an individual where in principle can we stop? Suppose medical discovery in the future evolves a technique whereby the truth may infallibly be secured from a witness by trepanning his skull and testing the functions of the brain beneath. No one would contend that the witness could be forced against his will to undergo such a major operation at the imminent risk of his life, in order to secure evidence in a suit between private parties. How then can he be forced to undergo a less dangerous operation, and at what point shall the line be drawn? To my mind it is not the degree of risk to life, health or happiness which is the determinative factor, but the fact of the invasion of the constitutional right to privacy." [40]

A comment in the University of Pennsylvania Law Review criticized the decision because it apparently regards the right of privacy as an absolute right although it has never been so considered.[41] In the Bill of Rights Review a very excellent discussion of the whole subject is presented and a view is taken contrary to the *Bednarik* case.[42] To make blood tests to determine paternity only a few drops of blood are needed for the comparative analysis. The court overemphasizes the seriousness of the risk involved in making such a test particularly when done by expert medical men. From the attitude expressed in the foregoing statement the court apparently assumes an inability upon the part of courts to use their good plain judgment and common sense in determining what might be a serious medical examination endangering health of the patient, and what might have but the most remote possibility of causing harm. The court ignores the many tests commonly required of persons now in carrying out the law in diverse situations. The opinion seems to overlook the fact that many states require a venereal disease test before parties are permitted to marry. Surely compulsory vaccination required of students in schools submits the person to a much greater danger than taking a sample of blood for analysis. The great number of tests now daily imposed by the army and the navy in the interests of the health of men in the service have not resulted in the widespread suffering which this opinion seems to assume would result from a compulsory blood test where it might

[40] Id. p. 652.
[41] 89 Univ. Pa. L. Rev. 518 (1941).
[42] 1 Bill of Rights Rev. 226 (1941).

produce scientific, reliable evidence. In workmen's compensation cases courts have generally recognized the principle that an injured employee cannot claim compensation when a slight operation would remove the disability.[43] In these cases the courts are required to determine the difference between a serious operation which might be of real danger to the employee and an operation which might be regarded as having slight possibilities of danger. It should not take much effort upon the part of a court to realize that taking a few drops of blood by expert medical men could not be regarded as impairing the health or life of an individual. It is believed fair comment to say that the *Bednarik* case has greatly overemphasized the danger involved in making a test and this overemphasis makes the argument that the test constitutes an invasion of privacy fallacious.

There is one very real difference between the taking of blood in cases involving paternity of a child and the taking of a body fluid specimen for evidence against one accused of a crime. In the latter situation the accused is under arrest, which enlarges upon the things which may be legally done to him. For example, it is unlawful for officers to search and seize things from the person of an ordinary citizen, but if he is lawfully arrested the right of search and seizure of things from his person exists as a matter of law. The blood test to determine intoxication will be largely used in criminal cases, perhaps mostly in drunken driving cases, and in practically every case in which the test is taken the accused has already been placed under arrest. There is a substantial difference, therefore, between these two classes of cases. However, it seems clear that the New Jersey decision was wrong even in the paternity issue. The court might well have concluded that, although the mother could have refused for herself and child to submit to the blood test, by doing so she would be compelled to forego the prosecution of her civil suit for divorce.[44] Where scientific evidence might accurately and honestly solve the issue in dispute, it is hardly in the public interest that some legal barrier prevents its use in cases in which the test would cause but slight inconvenience to the parties affected.

If the court should ultimately adopt the view, which it is hoped it will not, that it is necessary that there be consent on the part of the accused before a blood test is taken, the legal issue of what constitutes consent is presented. The first Supreme Court decision upon this subject is the Arizona case of *State v. Duguid* in which it was held that consent resulted from the accused's failure to resist and that he had thereby waived the privilege against self-incrimination.[45] Practically all cases dealing with this subject upon analogous situations have reached the same conclusion.[46] It might be claimed that

[43] *O'Brien v. Albrecht*, 206 Mich. 101, 172 N.W. 601 (1919); *Joliet Motor Co. v. Industrial Board*, 280 Ill. 148, 117 N.E. 423 (1917); Ladd and Gibson, *op. cit. supra* note 2, pp. 239–241. And see, in this Symposium Series: Ludlam, Plaintiff's Duty to Submit to Surgery to Minimize Defendant's Liability to Damages." (In press.)

[44] This would be analogous to the treatment of the Workmen's Compensation cases. Note 29, *supra*.

[45] 50 Ariz. 276, 72 Pac. (2d) 435 (1937).

[46] Cases collected and discussed, Ladd and Gibson, *op. cit. supra* note 2, pp. 241–251.

if intoxicated, the party did not have the capacity to give his consent. This view has not been accepted, except in the case of complete intoxication so that the accused is not conscious of what he is doing. The consent issue would be material, however, in the case of an injury to the drunken driver causing him to be unconscious. In this situation it would seem that for the benefit of the innocent accused the law ought to create some sort of an implied consent if consent is to be demanded at all. A rational application of the consent doctrine might well be that consent would be deemed to exist in all cases in which there was not a definite refusal.

The character of legislation upon the subject is in part related to the constitutionality of taking a compulsory test. If the court should adopt the view that a compulsory body fluid test is a violation of any constitutional provision, statutes providing for a test under such circumstances would be unconstitutional. The statute in Oregon provides for taking the chemical test unless the arrested person objects to it.[47] It also provides that a refusal of the arrested person to submit to the test shall not be admissible evidence against him. This later provision is contrary to the decision of the Iowa court in the *Benson* case. The Oregon statute makes no provision for the weight of the test as evidence but leaves this to the opinion of the experts giving testimony. The Maine statute specifically provides that certain percentages of alcohol in the blood shall be prima facie evidence that the defendant was under the influence of intoxicating liquor within the meaning of the motor vehicle act.[48] It then provides that the failure of a person accused of this offense to have tests made shall not be admissible in evidence against him. There is nothing in this statute specifically requiring consent before officers might order the taking of a body fluid test. The New York statute has no express provision requiring consent of one under arrest before taking the test but made such evidence admissible if the test is taken within two hours of the time of arrest.[49] It contains no provision against the compulsory taking of the test and it would seem that it is inferentially authorized. The Indiana [50] statute and the New York statute are practically the same.[51]

In the Indiana, Maine and New York statutes it is provided that if the body fluid contains .05 of 1 per cent or less by weight of alcohol it is prima facie evidence that the defendant was not intoxicated; between .05 of 1 per cent and less than 0.15 of 1 per cent by weight of alcohol in the blood relevant evidence of intoxication exists but it is not to be given prima facie effect of intoxication. If there was 0.15 of 1 per cent or more by weight of alcohol in the blood, this may be admitted as prima facie evidence that the

[47] Oregon Laws (1941) Chi. 430.
[48] Laws of Maine (1939) Ch. 273.
[49] It may be desirable that new definitions of intoxication be established to fit the danger involved. The state of intoxication to constitute a public danger might differ substantially for one walking down the street from one driving a motor vehicle or piloting an airplane. For excellent discussion of this problem see, Hall, Drunkenness as a Criminal Offence, 1 Quarterly Journal of Studies on Alcohol 751 (1941).
[50] McKinney's Consolidated Laws of New York (1942) § 70 (5).
[51] Burns Indiana Statutes Annotated (1940) Tit. 47 § 2003.

defendant was in an intoxicated condition. These provisions are significant. They make it technically unnecessary for the expert witnesses to testify as to the consequences of alcohol in the blood. When the amount is sufficient to make it prima facie evidence, the triers of fact are warranted in coming to the conclusion that the accused was under the influence of intoxication from the proof of the content of alcohol in the blood alone. This type of statute is believed to be desirable, although in the actual trial of cases it may be very helpful to use an expert to give opinion testimony to the same effect. Furthermore, as the expert will ordinarily be in court to give the result of the blood or body fluid analysis he should give further assistance in expressing his opinion, which, along with the instructions of the judge as to the prima facie case, should carry great weight.

The law has generally moved at a slow pace compared with the advance of science. It is hardly to be expected that fluid tests to determine intoxication will at one stroke be accepted as good law. Progress in the law in a large measure is an unfolding process which follows the general public acceptance of changing ideas and principles. Legal development comes through the courageous effort of forward-looking judges and law-makers who see the need of adapting the law to the growing discoveries of science and the growing needs of state and society. By and large the courts have displayed a fair consideration of fluid tests and have generally held them admissible as evidence. This should be encouraging even in the face of the decisions which have been disturbed by the compulsory aspects of the test. In the course of time these views will undoubtedly change. Many things in the law of evidence which 50 years ago were looked upon with doubt and suspicion are accepted as the general rule today without question. As science improves and as the results of earlier experimentation become more firmly accepted the courts undoubtedly will respond. It is doubted now if, after full study of the problem, many courts will regard the taking of fluid tests as being precluded by the constitutional provisions against unlawful search and seizure, self-incrimination, or due process of law as it relates to the right of privacy.

CERTAIN MEDICAL AND LEGAL PHASES OF EUGENIC STERILIZATION *

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Every program which proposes a reformation of society, whether in its biologic or sociologic structure, awakens fierce controversy which is usually independent of the merits of the situation. This controversy becomes the greater whenever sex or reproduction becomes the focus of the reform, since nowhere in the tangled web of human emotion and ideology is there more non-rationally based conduct than in this field. Therefore, it is to be expected that the points of view concerning eugenic sterilization disregard the essentials of proof and, like politics, the camps of the proponents and opponents of sterilization find strange bed-fellows.

There are grave weaknesses, as well as indisputable strength, in the postulates of those who favor eugenic sterilization. In the first place, there are large, relatively unexplored territories in psychiatry within whose universe of discourse belong the major number of people who are to be sterilized. Secondly, genetics itself is an evolving science which as yet has little substantial fact and understanding to explain the mechanisms of the inheritance of the mental diseases and the mental aberrations. Thirdly, and this, like the preceding two themes, will be elaborated, a reform of drastic nature must in a democracy have behind it a solid and educated public opinion, else it will not be enforced in any thorough-going way and, moreover, attempts at enforcement will lead to widespread social corruption and disunity.

Let us first consider the present day knowledge of psychiatry concerning those clinical groups in which sterilization is advocated. The psychiatrist is like the keeper of a zoo. He deals with diseases of different genesis and of varying degrees of substantial knowledge. These diseases are only united by the common fact of abnormal mentality, since the mental change under consideration may come from such diverse sources as the failure in sugar metabolism (pyruvic acid feeblemindedness), syphilis, alcohol, endocrinal disorder, injury to the brain of whatever source, the changes of old age, and may even be entirely unknown as to etiology.[1] We may exclude at once from genetic relationship the best known of the diseases with which psychiatry deals as fundamentally environmental in cause or so closely wrapped up with normal processes as to be mere accentuation of retrogression. It is highly significant that the diseases which are best known are non-hereditary in their genesis and that the diseases which are fundamentally unknown as to pathology and physiological mechanism are ascribed to heredity. "All cats look gray in the dark," and it is easy to postulate a unifying mechanism —heredity—where little is known, and this is a temptation hard to resist.

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Thus, general paresis, or, as it is officially known, dementia paralytica, is due to syphilis. True, there has been a valiant effort made to find a genetic basis for the susceptibility of any individual to brain disease following a syphilitic infection, since only 5 per cent of the total number of people infected by syphilis develop general paresis. In this connection it must be stated that logically there *must* be a constitution which permits any pathological change to occur. A stone cannot be infected by tuberculosis and even some species of animals have a constitutional inherited invulnerability to this disease, whereas other species are easily infected. But beyond syphilitic infection there is nothing to indicate that the individual who develops general paresis is fundamentally different from the mass of mankind, and from a practical standpoint it can be stated that whatever constitution is involved, syphilis is the essential factor in the multifactorial pattern by which the changes in the brain are brought about, and treatment remains the same regardless of any hypothetical constitution.

The situation is the same in that great bulk of mental diseases ascribable to arteriosclerotic brain changes and to the development of those plaques within the brain which bring about senile dementia. If any man lives long enough, he will develop an arteriosclerotic dementia or a senile dementia. No one as yet has been hardy enough to advocate sterilization to prevent the development of those mental diseases of the late fifties, sixties and seventies which are due fundamentally to the organic changes which take place with the passage of time.

The situation is somewhat more complex when we turn to the alcoholic mental diseases. Chronic alcoholism, by which these mental diseases are brought about, may be constitutional.[2, 3, 4, 5, 6, 7, 8] Certain facts, which I have published elsewhere, indicate that the chronic alcoholic belongs to no definite personality type; that the amount of chronic alcoholism varies with race and social culture, with the pressure of tradition and the general habits of a community.[9, 10, 11] If there is inheritance as a basis of chronic alcoholism, it is too vaguely demonstrated to be of any scientific value.

So, without considering other mental diseases of known origin, we may turn at once to those diseases for the prevention of which eugenic sterilization has been advocated on the ground of hereditary causation.

Schizophrenia is the first of this group of diseases to be here considered. Unfortunately, there is no clinical definition of this condition which is universally accepted, and error in diagnosis, especially in differentiating it from manic-depressive psychosis, occurs very commonly [12, 13, 14, 15, 16]—to the point where it can safely be said that individual idiosyncrasy on the part of the psychiatrist is a factor in diagnosis. No one knows its pathology despite heroic efforts and the development of many theories, although it is only fair to say that there is a moderate accumulation of facts concerning its physiology.[17-32]

The foregoing is true of another major problem of psychiatry—the manic-depressive states. The typical manic-depressive state presents a clear-cut syn-

drome, but there are many cases in which the diagnosis remains in doubt even after years of study and observation. These cases blend with the neuroses and also with schizophrenia. Both the depressive and the manic phases often seem like accentuations of normal temperament, and it is quite certain that there is some degree of relationship to temperamental type, although the work of Kretschmer [33] ascribing a relationship to a pyknic body form can at this time be discarded as non-relevant. Little is known of its pathology or its physiology,[34, 35] and it seems definitely to occur without any specific environmental precipitation,[36, 37] just as does schizophrenia.

Here are two important groups of diseases which seem hereditary, yet the hereditary mechanism by which they are passed from one generation to another is unknown, and so is their essential psychopathology and organic physiological basis. For if they are hereditary, they must have an organic-physiologic basis, since we cannot scientifically conceive of mind passed from generation to generation without physical structure.

What has been here stated of schizophrenia and manic-depressive psychosis is also true of the groups of conditions lumped together as feeblemindedness. The various types of feeblemindedness are united only by the fact that the individuals concerned are incapable of normal learning by reason of a postulated congenital defect in intelligence.[38-49] The mental defects vary in degree from that of the idiot, who is beneath the level of a reasonably intelligent two-year old child, to that of the imbecile, who rarely if ever at all can learn to read and write, and the moron whose level of intelligence, although it permits him to carry on some work in the world, never evolves to a point where he is capable of handling abstract ideas, learning anything much beyond the range of his own immediate experiences which are extremely limited, and who can take up only those occupations and activities which involve the exercise of a very limited memory, a lessened skill and an inferior judgment. But this classification is not in terms of cause, since it only measures degrees of deficiency and has no relationship to causation. An individual suffering from the Mongolian type of feeblemindedness may have the same level of intelligence as a cretin, but cause and pathology are very different in the two cases.

Thus, feeblemindedness may arise from deficiency of the thyroid gland (cretinism),[43] difficulty in the sugar metabolism (pyruvic acid metabolism),[50] failure of the glands to develop as in Mongolian idiocy,[43] and many forms of pituitary disorder,[43] birth injury,[43] encephalitis occurring early in life,[43] injury to the growing and developing brain by reason of whooping cough,[51] and so through a long list of failures or injuries of body organs and brain. This is to say nothing of the accumulated defects which are known to arise through starvation, vitamin deficiency, extremely bad environmental conditions and the like.[52, 53, 54, 55, 56]

No animal breeder, however much he laid his emphasis on breeding and heredity, would think of subjecting the animals with which he was concerned to the cruel, stupid and harsh conditions which constitute the life situation

of a great many of the children of mankind. Yet it is precisely in the field of the feebleminded that the eugenists have laid most of their emphasis upon the need for sterilization, and many myths have been developed in the field of feeblemindedness which have no scientific basis whatever. Elsewhere [57] I have criticized adversely, perhaps harshly, the work which has built up the "royal families" of the feebleminded, the Nams, the Kallikaks, the Jukes, the Tribe of Ishmael, the Virginians, the Mongrels, etc. Without in the least denying the important rôle of heredity, it can only be stated that low cultural level, especially occurring in sequestered groups, has been called feeblemindedness on very scanty and insufficient evidence—evidence which any court of law would throw out as the worst kind of hearsay and which science should not even consider.

The bulk of feeblemindedness is utterly unknown as to genesis, pathology and disorder of physiology. I lay emphasis upon this because it is insufficient to say "heredity is a cause," since heredity is no unified set of mechanisms. If we say diabetes is inherited, we can at least define diabetes in terms of sugar metabolism. We can test the sugar metabolism of the ancestors and descendants, as well as of the siblings and collaterals. The diagnosis can be definitely and completely made. Even if we do not understand the complete genesis of diabetes on a physiological basis, we do know that disorder of the pancreas and very likely of the pituitary body, as well as the cortex of the adrenal, plays important rôles.

When we turn from these vaguely known diseases and ascribe them to heredity, we are at least in part explaining one unknown by another. The science of genetics has largely been built up by animal experimentation, and the work can only be called brilliant and far-reaching. The establishment of Mendelian laws, the evolution of the theory of the gene, represent two great landmarks in the history of the understanding of the mechanisms by which like begets like and by which variations appear.[58, 59, 60, 61, 62, 63, 64] But this work is only in its beginnings. It is changing rapidly. There is a growing body of evidence to show that Mendelian laws explain only variations—what I have called "adjectival" attributes rather than the "nouns" of quality.[65] Thus, Mendelian laws explain the greenness and the smoothness of pea pods, but they do not explain the universal occurrence of pods which seems to be independent of Mendelian laws.

Much work has been done in the field of physiological genetics to show that environment at all times plays a rôle in the evolution of hereditary qualities and in their evocation, and that a drastic change of environment may call into play what seem like opposing or at least markedly different hereditary qualities.[61] Experiments of far-reaching importance have shown that slowing up or accelerating the series of those timed evolutionary changes, by which the fertilized egg becomes an individual of a species, alters drastically the development of the individual.[58, 66] There may be, and I believe there is, sick germplasm [67, 68] which lasts over a considerable span of generations and adversely affects generation after generation. To separate environment

from heredity is a useful dichotomy, but one which becomes pernicious when it becomes viewed as an absolute fact rather than as an abstraction of the human mind.

It is interesting to note that certain groups of people tend to become strict hereditarians and thus to view failure in life and the occurrence of disease as evidence of congenital inferiority. Conservative groups, as a rule, take this point of view. On the whole, these people are well satisfied with the status quo. They do not like the idea that their success and the failure of others may be accidental and environmental. The arrogant and the proud tend to be hereditarians and to neglect the environment entirely. Thus, a leading feature of Nazi ideology is the importance of blood, and all the studies which emanate from Germany have emphasized racial superiority, stock superiority and eugenics.[69, 70, 71] They have not hesitated to sterilize and to destroy those whom they regarded as inferior in race and of inferior germplasm and constitution. Curiously enough, this ideology favors war which is by far the greatest cacogenic factor in the world, since the best are sent out to be destroyed.

The biologists as a group, although with notable exceptions,[61,62] have tended to emphasize the germplasm largely because their experiments are carried out isolated so far as possible from the environment. They deal with animals of simple type and have mainly concerned themselves with the inheritance of simple qualities of bodily type rather than with the complex human attributes and that complexity of complexities—the human mind. They have tended to oversimplify the problem. . . . Furthermore, those who have been impressed by the hopelessness of much of the therapeutics of psychiatry, who have been appalled by the rising cost of caring for the mentally sick, the epileptic, the feebleminded and the criminals have sought the impatient reform and have advocated sterilization more from despair than from real understanding.

If we turn to those who oppose eugenics,[70] we find here, too, a curious conglomeration of bed-fellows. The Roman Catholic Church has laid down in the Encyclical of Pope Pius XI [72] the basic proposition that sterilization is a mutilation which is not a punishment for crime and, consequently, an invasion of the sacred rights of man. Thus, a theologic concept is made the basis of opposition to what is essentially a biologic social reform. This point of view may be linked up with the attitude of the Church towards birth control, namely, that there must be no interference with procreation. It is curious that the Church, which insists on celibacy in its ministers and officers, is the most ardent advocate of unrestricted population increase.

On the other hand, the Bolshevik ideology, which in so many respects is anathema to the Catholic Church and which at least in its earlier development was completely opposed to religion, is also an enemy of eugenic sterilization and stresses environment, since this is in line with the general principle of economic determinism as fundamental in shaping the mind as well as the destinies of mankind. It is in general distasteful to Bolshevik science to at-

tribute mental development and mental disease to heredity, and many enthusiastic Bolshevists have stated that by reforming society along the lines of Communism the mental diseases will and do diminish and disappear.

Social reformers of the liberal type, that is, those who are appalled by injustice and seek freedom for the individual, tend to emphasize environment and to deny the importance of heredity as a factor in the genesis of the mental diseases, as well as of crime and social maladaptation. It is not an accident that students of history like Buckle,[73] who ascribe the evolution of peoples to environmental forces, and social philosophers like Hobhouse,[74] studying the evolution of morals, question and quite cogently the kind of proof on which eugenics rests.

If we turn now to the third item of the introduction, namely, that in democracies eugenic laws need a solid public opinion behind them before they can accomplish anything, we can marshal abundant and direct proof by the history of eugenic laws in the United States, and in addition the history of the Prohibition Amendment is very convincing.

Twenty-seven states have passed eugenic laws of one type or another.[75, 76, 77] For practical purposes these laws can be divided into two main groups: (1) Those mentally sick, feebleminded, epileptic and criminalistic individuals likely to reproduce socially inadequate and maladjusted persons are to be sterilized by mandate and without any necessary consent on the part of themselves or those responsible for them; and (2) those laws which make such consent a necessary condition of sterilization.

In most of the states the number of sterilizations, compared to the number of those defined as liable to transmit adverse mental and social qualities to their descendants, is almost ridiculously small and clearly demonstrates what I have stated above, namely, that unless there is a favorable public opinion, a new law which operates against the opinions of strong and established groups of people accomplishes little.

The following are a few samples of the way the laws have been enforced in various states of the union:

(1) Connecticut: A compulsory law was passed in 1909 and amended in 1919. Up to 1935, 391 operations had been performed (19 males and 372 females), an average of 15 sterilizations a year, which certainly does not indicate that the compulsion is utilized in anything like adequate degree.

(2) Idaho: A law, non-compulsory, was passed in 1925. Up to January, 1935, 14 operations had been performed, indicating that the law is practically a dead letter.

(3) Michigan: A compulsory law was passed in 1923, which also provides for sterilization with consent. Up to January, 1935, 1,239 operations had been performed (307 males and 932 females), an average of slightly over 100 a year in a populous state.

(4) Nebraska: The present law was passed in 1929, is compulsory for feebleminded before leaving institutions and non-compulsory for the insane

before discharge or parole from a state hospital. Up to January, 1935, 276 sterilizations (112 males and 164 females), or about 46 a year had been performed.

(5) Oklahoma: A compulsory law was passed in 1931. Up to January, 1935, eight operations had been performed (one male and seven females). No comment!

(6) Washington: A voluntary law was passed in 1921. Up to January, 1935, 30 operations had been performed (24 females and 6 males).

Therefore, it is clear that if sterilization laws of any type are to be passed, even though the scientific proof be incontestible, public education as a preliminary is essential.

Certain myths must be dispelled in order to view our problem realistically: first, that the number of insane is increasing by leaps and bounds and, therefore, the race is threatened in a serious way by the propagation of the unfit.[77-86] It is true that the admission rate to hospitals for mental disease has gone up enormously within the past few generations.[1, 14, 87, 88, 89, 90, 91, 92, 93] But let us suppose that in China there were no hospitals, then the admission rate would be nil. As hospitals were built and the oriental members of the community became conscious of mental disease as something treatable, and if they regarded the hospitals favorably, the admission rate would go up from zero to a point which finally reached the real incidence of committable or hospitalizable mental diseases. This is actually what has taken place in some communities in America and which is taking place in some other parts of the world.

If we take two American states, Massachusetts and New York,[94] as representative of communities with well established hospitals and with a reasonably good understanding of mental disease, we find that in these two states the commitment rate has changed but little during the past 20 years. Moreover, this is true of England, Wales and New Zealand.[93] There are cogent reasons why mental disease would not be expected to increase in the more enlightened communities of the United States and Europe.

In the first place, the marriage rate tends to be low in most of the important and transmissible mental diseases.[95, 96, 97, 98, 99, 100] Secondly, the death rate is high.[71, 84, 101, 102, 103, 104, 105] Third, the birth rate is low, contrary to the usual opinion.[1, 43, 99, 106, 107, 108, 109] This is in part a resultant of the lower marriage rate and the greater death rate, but is to some extent independent of it. Fourth, even the divorce rate[110] is higher among the mentally sick.

All these factors can be easily understood. Marriage acts as a barrier to the unsuccessful, the unattractive, the odd and the peculiar, and those who create unfavorable reactions. Moreover, in many of the mentally sick there is a lessened sexual drive. The divorce rate should be higher, too, since life with a person of unstable temperament and on the road to a mental disease is very difficult and often unbearable, so that divorce often takes

place before the psychosis shows itself in recognized form. Since the conditions of life tend to be worse for the mentally sick than for the mentally well, and because the general health suffers with most mental diseases, and finally because there is undoubtedly a general biologic defect as well, the death rate would be expected to be greater.

In the case of the feebleminded the above holds true, even though it runs quite completely counter to the unscientific studies represented by the Nams, the Kallikaks, the Jukes, etc. I refer the reader to the British Report of the Departmental Committee on Sterilization,[108] which flatly declares that the prolificity of the feebleminded is a myth, and also to the paper by Walter E. Fernald[111] which shows that in the case of the discharged and known feebleminded from an institution in Massachusetts, there was a low marriage rate and a very low birth rate. What is mistaken for the high birth rate of the feebleminded is the high birth rate of low cultural level. Statistics collected by Elkind and myself,[43] as well as by Popenoe,[100, 109, 110] indicate, first, that the feebleminded tend on the whole to come from families representative of the community as a whole, and secondly, there is not an unbalanced or disproportionate birth rate. Dayton's statistics[1, 68, 101, 102, 112] indicate very clearly that the death rate among the feebleminded is proportional to the degree of feeblemindedness and is greater than that of the normal population.

It is, I believe, safe to say that the vital statistics disclose the factors which operate against any considerable increase of the mental diseases and of feeblemindedness. It is also true that we have become much more conscious of these conditions. A defective individual might adjust to a simple pastoral life but not be competent to meet the stresses of a civilization which demands the ability to learn to read, write, calculate and carry on relatively complex mental processes. A feebleminded shepherd would not be particularly noticed, but a moron trying to operate machinery would show his defectiveness very quickly.

I here summarize the report of the Committee of the American Neurological Association for the Investigation of Eugenical Sterilization,[113] of which committee I was chairman and of which it is only fair to say that I was the worker mainly responsible for the report. Based on a review of the world's literature, and more especially of the recent work since the older writings have only historic value in this complex field, and with especial consideration of the fine studies of those touchstones of modern genetics, the monozygotic (or identical) twins, this[45, 114, 115, 116, 117, 118, 119, 120, 121] Committee reached the following conclusions:

(1) Schizophrenia has an inherited basis[122–132] although this is not the entire story, and there is very likely an environmental root or factor of some kind which at present is entirely unknown.

(2) The same is true in about equal measure of manic-depressive psychosis.[37, 133–143]

(3) It can be stated of feeblemindedness that the bulk of it rests on a hereditary basis of some type; that there is an inheritance to intelligence although not of the "like begets like" variety, since despite the fact that there are families of feebleminded, the bulk of the feebleminded—according to reliable work—comes from families which are on the whole representative of the total community in social standing, achievement and general intelligence. This is certainly true of the cases one sees in private practice where sporadic feeblemindedness frequently appears among groups of the highly intelligent and where relative feeblemindedness—in the sense that an individual, although he develops above the level of the accepted standard for the feebleminded, is, compared to the advantages and the group among whom he has lived, definitely deficient in intelligence—represents by far the greatest part of feeblemindedness. Nevertheless, and excluding the work obviously faulty, no serious worker in the field of feeblemindedness doubts that a great deal of mental deficiency, if not the most of it, is congenital and probably hereditary in origin.[1, 40, 42-44, 48, 144-153]

(4) Of epilepsy the Report [154] stated that there was some constitutional etiologic basis, but that it was not proved to be of hereditary origin.[155, 156, 157, 158, 159, 160] Recent work has tended to show that there may be more of a hereditary basis than we assumed to be the case. This depends upon the study of the brain waves and is the product of a notable Boston group of workers, Lennox, Gibbs and Gibbs.[161, 162, 163, 164] I believe that the study of brain waves has not reached the precision and reliability which these workers assume it to have, nor do I agree that the kind of brain wave they describe is limited to epilepsy, so that their studies showing abnormal brain waves in the parents, collaterals and siblings of epileptics, which they assume prove the hereditary basis of epilepsy, are not so well founded as one might believe to be the case at first glance. An important paper attacking their assumptions in this matter is that of Finley and Dynes.[165] Epilepsy, or, more precisely, the convulsive states, appears to be producible in all forms of life beyond the most primitive, can be brought about in any human being by drugs, electricity, and brain damage, and so differs radically from schizophrenia and manic-depressive psychosis. The most that as yet can be said as to its relationship to heredity is that some individuals and familial groups are more liable to it.

(5) So far as crime is concerned, this being one of the conditions which ardent eugenists expect to be reduced by sterilization,[70, 77, 166, 167, 168, 169, 170, 171, 172, 173] I can only say that this Committee rejected in general the hereditary nature of most of crime.[73] There are too many social variables in crime for it to be accepted as an essentially biologic condition. It may well be that some criminals are abnormal variants. This is surely not true of all of them, and the studies which have purported to prove this have, on the whole, been too precariously based on the shape of ear lobes, height, weight, head-form to have reached a place worthy of the name scientific at this time. There are individuals who lack social feeling, who are crass and crude ego-

tists, who find conformity difficult, and such individuals are found at the top of the social ladder among the successful as well as at its bottom and among those who are incarcerated in jails.

At this point, one may bring up the question of the existence of a psychopathic society.[174, 175, 176] Adjustment to any society is normal or represents normality only if it can be assumed that the demands of that society are in conformity with the essential drives, instincts and evolution of the normal man. For example, our society emphasizes acquisitiveness and over-rewards the pathologically acquisitive, since, as Aldous Huxley says, there are as many perversions of the acquisitive instinct as there are of the sexual. That there may be conflict of biologic and social demand can be cogently exemplified by the case of a 16-year old girl who has become pregnant without the formality of marriage, but who is biologically normal although socially maladjusted; whereas the social worker who looks after her, a virgin aged 50, is biologically abnormal although socially adjusted. Society is not at all rational about sex, marriage, work, pleasure-seeking, entertainment and achievement in general. It is doubtful if he lives best who works all day long, is humble, frugal and passively law-abiding. A non-conformist rebel who gets into all kinds of social trouble may be and often is a better human specimen.

Our Committee, taking into account the social structure of our times, the prejudices and taboos which reign, the conflict and the welter of opinion, came to conclusions which are here stated in abridged form. We accept as a reasonable working hypothesis that certain of the mental diseases rest on a constitutional and a hereditary basis, and that a program of eugenic sterilization is indicated and desirable. These diseases, excluding from consideration at this point the very rare neurologic disorders,[177] such as Huntington's chorea, Friedreich's ataxia, myotonia, etc., are schizophrenia, manic-depressive psychosis, most of the forms of feeblemindedness, and possibly epilepsy. We advocate, therefore, the passage of voluntary laws to apply to certified cases of these diseases, either within private or public hospitals or cared for in the community.

The most important conclusion is that neither the psychiatrist nor the eugenist can afford to be dogmatic in his opinion. What is needed most of all is an organized research, preferably by some great governmental agency, and the ideal agency would be the United States Public Health Service. This research might well take the following main directions:

First, coördinated long-time studies on the epidemiology, psychology, physiology, chemistry and physics of the patients who form the subject matter of psychiatry. Groups of specially trained men should be set free from economic pressure to devote their lives to such researches.

Second, an institute organized for a continuing program of at least 100 years should be established for the study of human heredity. One man's life-time is not long enough, because he lives only as long as his subjects,

and his working career is rarely more than 40 years. Several generations of people must be intimately known and their lives scientifically recorded before we can know much of human heredity. The workers in this institute should include not only scientists in each field which is pertinently involved, but also the best of statisticians as well as high-grade field workers capable of social investigation of an objective type.

It needs emphasis at this point that one of the cardinal assumptions of the rabid eugenists,[78, 83, 178, 179, 180] namely, that there is a fundamental antagonism between eugenics, or being well-born, and euthenics, or social betterment and amelioration, is not in its generality true. There are social ameliorations and euthenic measures which probably are not of value to the race and even hurt it. Thus, nursing along an obviously defectively constituted child so that he reaches maturity, can marry and procreate, certainly seems non-eugenic, even cacogenic. Furthermore, whatever steps we take for the cure of, let us say, schizophrenia, should be associated with eugenic measures and if we do finally, as I believe we will, discover methods for the cure of schizophrenia, manic-depressive psychoses and others of the mental diseases, it may be of great importance to establish sterilization as a condition of treatment, unless it can be shown that the curative measure also cures the germplasm, which at first blush seems unlikely.

In its broader scope, however, euthenics makes the race better rather than worse. An epidemic has no particular predilection for the unfit.[181, 182] It merely carries off those less resistant to it, and this does not bear any relationship whatever to our human values of fitness and unfitness. Moreover, epidemics, malnutrition, and the serious adverse conditions under which many of the people of the world live very definitely injure otherwise sound persons, and/or prevent the full development of hereditary potentiality. Accident, disease, social privation and cacothenic influences are not disguised eugenic measures. In fact, it is possible—and without any scientific warrant I believe this to be the case—that they injure germplasm. There is no reason to believe that the germplasm,—that is, the chromosomes and genes—, as well as the rest of the egg and the seed, may not be injured by the same illness that affects the heart, the lungs, or the brain of the individual. The program of euthenics may, therefore, be considered a part of eugenic betterment; and legislation which provides the best of food and housing, sunshine, reasonable hours of employment and adequate compensation, social insurance of necessary kinds, as well as good medical care, although it may be defined as euthenic, is also eugenics of a positive type.

It is time medical biology and law made some kind of a formal alliance with a division of labor and a unified purpose for the social good. The division of labor can be compared to the two different and collaborative functions of the nervous system. Science, as one of the partners, has for its business the sensory function; that is, it gathers the information by scientific technics, analyzes its experiences and experiments according to statistical methods, and so reaches proved conclusions. The job of putting the indi-

cated program of social reformation into activity—the motor function—belongs to law. Having assured itself that the propositions evolved by science are solidly established and accepted, to it belongs the task of manipulating the unwielding and prejudiced society into line. Whatever laws it passes must be capable of being enforced, for however good scientific theory and postulates may be, there are social principles of conduct, taboos, unreasonable attitudes and non-rational traditions which must be taken into account. Other rights of the individual must not be violated even though to do so seems to be a short cut to reform. The law or, more personally put, the legislators and the executive and legal directors of society have the duty to be equitable and practical at one and the same time in such a matter as eugenic sterilization. Science must gather the material and present the facts. Law, especially in a democracy, must possess the guilelessness of the dove and the wisdom of the serpent in framing suitable legislation and workable technics for their operation in the particular society within whose framework the reformation is to be wrought.

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MEDICAL AND SOCIAL FACTORS IN CRIME*

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When a child is born his behavior is almost entirely on a physiological basis. He reacts to various stimuli on a reflex level and draws upon his heritage through past ages for motivation. In other words, his conduct is asocial. His parents begin the task of training forthwith, just as they would in the case of any other animal. This training at first has to do with the regulation of the various functions of the body and with teaching a certain amount of decorum. For a long time it has been recognized that children differ in their capacity to receive this sort of guidance. In some, tidy habits can be acquired in three months, in some six months or a year, and a few can never be taught correct habits. Obviously, the technic of the parent can be resolved to a very simple formula, the punishment of vice, and the reward of virtue.

Upon reaching the age of five or six the child is sent to school, his behavior is then dependent upon the thoroughness with which the previous parental duties have been carried out. Here a new factor comes in to direct the instinctive drives of the little animal. He is directed to a certain extent by teachers, but more important still is the social pressure which comes from his associates. They begin teaching him the ways of the world. Brutally and cruelly they ridicule or punish deviation from the customs current in any particular community. To be sure he learns to read and write and to add and subtract, but he also learns how to behave like the other children. Here again it has long been observed that there are individual differences in the ease with which this latter knowledge is acquired.

A few stormy years of adolescence, more or less hectic according to individual qualities, and he is embarked upon adult life. Here he has the task of conforming to the requirements which the adult population imposes upon him, and especially he must get a job, fit himself to his employment, and then get a wife, establish a home, and begin the same program which he has just completed, with another generation. He continues to develop and progress through mid-life. Then come the effects of the disintegrating process of later years, and finally he leaves life as he entered, entirely helpless. Such is the traditional trajectory of life.

Society in the main tends to approve and reward the conventional life. Just as parents direct the child through praise and blame, society controls the adult. The mechanism is identical. However, some do not conform and from the dawn of history we can trace the efforts of society to induce or compel conformity to a conventional pattern. In primitive society this is done ruthlessly. There are no laws, but there are mores and the non-conformist is hunted down and destroyed much as a skunk or snake is destroyed

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by civilized persons. By common acclaim only, the non-conformist is destroyed.

As we ascend the long hard climb through various stages we find a gradually developing attitude toward criminals. While the savage governs his conduct by the pleasure or displeasure of the spirits, in early biblical days it was the purity of the city which was being sought. Personal motivation in punishment has always been identical, but the assigned purpose has always been altruistic. In the Roman days abstract justice became the goal and later the deterrent effect of punishment.[1]

This brings us up to relatively modern days. To this point there has been little thought of individual differences, most legal philosophy having to do with the social damage and abstract theories of right and wrong. During the great revolutionary period, punctuated by the French and American Revolutions, there was a great awakening in humanitarian fields. Man could no longer see his neighbor drawn and quartered, or burned at the stake, and the so-called sanguinary laws of Europe were abolished in Massachusetts in 1786. The work of John Howard either caused a universal awakening or was the expression of such. One of the immediate phases of John Howard's work was an interest in the sanitary conditions of prisons. So unhealthy were they that the scourge of typhus fever was popularly called "jail fever." The bad smell of dirty, sick bodies was referred to as "prison odor." So Howard drew up plans for a penitentiary house with single cells where men could have a chance for penitence and prayer and be cured. The first of these was erected in New York in 1798. In 1805 the Massachusetts State Prison was opened. No greater idealism was ever expressed than that which gave rise to the Charlestown State Prison. Benevolence and religion seemed to offer salvation from the scourge of crime. Yet in a very few years it was found that all persons could not be cured by this method. Those who had been once in the penitentiary tended to come again. Almost for the first time individual differences were indirectly taken account of and in 1818 an habitual criminal law was passed.

In 1816 an act for the relief of poor debtors was passed, thus recognizing the helplessness of this class. In a general way the series of laws softening the punishment of debtors was opposed by the legal profession. It was thought that if debtors were not punished that no one would pay his bills. Here again, no allowance was made for individual differences. We shortly enter an era in which education and training appear to be the answer to the problem of criminology. In 1821 [2] the House of Industry was established in Boston modeled after previous ones in Marblehead and Salem, and if one reads the report of the committee recommending this he finds that honest work and learning a trade are offered as cure-alls for this type of social ills. In 1824, the House of Refuge was opened in New York and shortly after a similar one was opened in Massachusetts.[3] It was thought that the proper training of neglected children would furnish the key to the cure of crime and their published reports breathe great optimism as to the future.

The Livingston Code begun in 1821 provided for the abolition of capital punishment and its spirit was remedial rather than vindictive. Already, in the appointment of physicians, a considerable beginning had been made toward remedying the sanitary condition of prisons.

Meantime the reformatory movement had grown to full stature having its origin with Admiral Macanochie in 1798.[4] This gradually developed into the Irish system perfected by Sir Walter Crofton in Dublin. The American replica of the Irish system first appeared at the Elmira Reformatory. An excellent account of this is found in Wines.[5] Here again a formula was offered for the cure of crime regardless of individual differences.

In 1875 the Massachusetts State Board of Health made its famous report of the sanitary conditions at the Charlestown State Prison showing that even at this relatively modern time rather inadequate provision had been made for the health of inmates. From then on medical services in prisons were improved and the medical component in the care of prisoners showed a rapid increase. Finally, some prisons were actually the healthiest places in the world.

There was gradually accumulated a vast store of knowledge throughout all this period of the relation between physical ill health and crime. Cripples, the blind, persons with tuberculosis and other chronic diseases, unable to compete on equal terms with their fellows, were found in prisons out of all proportion to their occurrence in society.

It is difficult to say when an interest in the mental state of prisoners began. Benjamin Rush [6] in his celebrated book published in 1812 has a page or two on moral insanity followed immediately by a plea for more humane treatment of prisoners. In 1835 when the Worcester Lunatic Asylum was opened a great many of its early inmates were taken thence from prisons and the Fourth Annual Report of Dr. Samuel Woodward, Superintendent,[7] gives a lurid account of their treatment in prison and the condition in which he found them. The report of Thomas Hazard in 1854 gives similar examples from Rhode Island. Gradually, the policy of removing the insane from prisons was definitely established, but there was a plague spot in the determination of sanity. One of the earliest expressions of this and one of the best is an account of an individual in a Dublin asylum which is quoted as follows: [8]

> In the Richmond Lunatic Asylum, Dublin, Mr. George Combe saw a patient in 1829, who has been confined for ten years. He exhibited a total want of moral feeling and principle, yet possessed considerable intelligence, ingenuity, and plausibility. He had been a scourge to his family from childhood—had been turned out of the army as an incorrigible villain—had attempted the life of a soldier—had been repeatedly flogged—had since attempted the life of his father. Respecting this man, Dr. Crawford, Substitute Physician at the Asylum, made the following remarks: "He never was different from what he now is; he has never evinced the slightest mental incoherence on any one point, nor any kind of hallucination. It is one of those cases where there is great difficulty in drawing the line between extreme moral depravity and insanity, and in deciding at what point an individual should cease to be considered as

a responsible moral agent, and amenable to the laws. The governors and medical gentlemen of the Asylum have often had doubts whether they were justified in keeping him as a lunatic, thinking him a more fit subject for a Bridewell. He appears, however, so totally callous with regard to every moral wrong, so completely destitute of all sense of shame or remorse, when reproved for his vices or crimes, and has proved himself so utterly incorrigible throughout life, that it is almost certain that any jury, before whom he might be brought, would satisfy their doubts by returning him insane, which, in such a case, is the most humane line to pursue. He was dismissed several times from the asylum, and sent there for the last time for attempting to poison his father; and it seems fit he should be kept there for life as a moral lunatic: but there has never been the least symptom of diseased action of the brain, which is the general concomitant of what is usually understood as insanity. This, I consider, might with propriety be made the foundation for a division of lunatics into two great classes,—those who were insane from original constitution, and never were otherwise; and those who have been insane at some period of life from diseased action of the brain, either permanent or intermittent."

With the rapid development of hospitals for mental disease there grew up a specialty called psychiatry dealing at first with those gross mental disorders called insanity, but gradually coming to concern itself with behavior disorders of every nature. As early as 1905, Dr. Guy Fernald, a psychiatrist, was appointed physician to the Massachusetts State Reformatory at Concord and began a life of service in the interests of a scientific criminology. This was followed by similar appointments elsewhere, and elaborate systems of classification developed. This effort grew more and more complex, but, alas, cures were infrequent. It was recognized that a varying percentage of inmates were insane, and these were taken to hospitals for mental disease. It next appeared that a larger percentage were feebleminded. An attempt to handle this group resulted in the passing of laws for the committing of defective delinquents, especially in such states as New York and Massachusetts. Then came the great schism over personality disorders. Some important persons believed that all gross vagaries of conduct were in themselves prima facie evidence of a certain degree of mental aberration, while others insisted upon gross evidence of psychopathy as a criterion. This question is still undecided and perhaps is no better stated today that it was by Sampson.[9]

The question of the mental status of prisoners in actual practice is largely an academic one except in the field of juvenile delinquency and in the case of particularly serious crimes. The great mills grind on. The courts in our large cities see hundreds and thousands of cases each year with little regard as to the mental condition of petty offenders.

Perhaps the greatest contribution of the psychiatrist has come through the fact that careful histories of offenders were taken which not only brought out the mental attributes of the individual offender, but also portrayed the environment from which he had sprung. This led to extensive research in the field of sociology by many of the leading sociologists of the country.

The writer has for many years regarded the vast majority of criminals as handicapped persons. Society has recognized three types of persons

needing public aid. These have been called the sick, the poor and the bad, and have led to the establishment of hospitals, poorhouses, and prisons for their care. All that we can say of these three groups is that certain individuals are preponderantly sick and therefore their illness is what calls for first attention. Others are preponderantly poor or bad. In the field of etiology their difficulties appear to spring from the same source. They all tend to be handicapped, each one with a large medical component. A most cursory scrutiny of the several types of institutions for these individuals shows that there is a tremendous overlapping. The relation between poverty and disease is a very definite one, although there is still a great deal of debate as to which is primary. This is a good deal like the proverbial debate as to which comes first, the hen or the egg. Obviously, there are certain persons who are physically ill and because of this handicap become impoverished and because of their impoverished condition are led to crime. Although it will be possible to fix the blame in individual cases, in general, crime, vice and disease are triplet sisters all springing from the same social sources. Needless to say the mental status of the individual is often very fundamental, and for this reason it may truthfully be said that basically crime is a social disorder. Mental disease, defect, or peculiarity is important in that social stress often bears hardest upon those who are least able to withstand its pressure. It seems helpful, however, to have some working classification of this very complicated and mixed social and medical problem. The following classification has served the writer's purpose in this matter.[10]

The Child: As has been said above, the child is by nature a non-conformist. The law recognizes his helplessness in some ways until he is 21 years of age. He is entirely dependent upon the status of his parents and home and the task of being taught the ways of prudent conduct. Furthermore, many criminal careers begin during adolescence and it appears to be a phase through which they go. This is well expressed by Cabot in the introduction to Dr. Glueck's book.[11]

The Aged: Likewise the helplessness of old people is proverbial and yet, they are often obliged to lead a competitive life. For this reason their handicaps frequently lead to delinquency. Furthermore, there are factors in their sexual life which lead to difficulties.

Handicapped Classes: There are many groups in our society against whom great odds are arrayed. Differences in race, sex and religion render the task of a conventional life more difficult for a substantial proportion of our population.

The Insane: Nobody knows how many insane there are, but their clashes with the law are such that it is necessary to confine in Massachusetts about 1/150 of the population.[12]

The Feebleminded: Certain children do not develop intellectually and are called feebleminded. It is estimated that about 2 per cent of the population should be so classified. We have just been through an age when the feebleminded have been pictured as peculiarly criminalistic and now their helpless-

ness seems to be a larger factor. They often come from feebleminded families and so are neglected. Those needing the most training often get the least.

The Neurotic: Although not specifically criminalistic, the handicap of the neurotic person is occasionally associated with crime.

The Disordered Personalities: This group occupies a vague zone in the social hierarchy and is still ill-defined by the medical profession. It has to do with those persons who, through personal peculiarities, are unable to adjust and adapt themselves to the requirements of society, and so become social problems in one way or another. The morbidly contentious find it difficult to obtain employment. They are continually agitating, and nobody wants them. They are frequently found on relief, in prisons and even in hospitals for the insane. The inadequate personality often gives up without a struggle and is feebly resistant to alcohol, and the emotionally unstable are often incapable of sustained productive effort. This group not only forms an important component in definite social disorders, but makes up a large number of those who are found in clinics appearing on the surface as neurotic. Needless to say, many of these persons appear in the sedimentary stratum. Certain states have passed laws for the commitment of such individuals if their conduct is criminalistic.

Drug and Alcohol Addiction: Addiction to habit-forming drugs including alcohol, has long been considered a medical problem, and, in the past, there have been many programs under medical stimulus and leadership attempting to attack this problem in an intelligent way. We have no census of alcoholic patients, but every index tends to show the load to be tremendous. There are approximately 84,863 arrests in Massachusetts every year for drunkenness. Thirty-two per cent of the patients admitted to the state hospitals are said to be intemperate. Alcoholism has been shown to be a very large component in the admissions to the Boston City Hospital. There is no more discouraging problem with which to deal than that of alcoholism. The police handle the same cases over and over again. Certain persons have literally hundreds of sentences to jails and houses of correction. At the present moment, although there has been very recently a vigorous attempt to promote attention to this group, there is no state-wide program for prevention or cure, nor is there an adequate meeting of the minds of police, welfare and medical authorities. Quite a bit of the beneficent effort to raise the level of living of certain of the dependent groups is almost entirely vitiated through diversion of relief from the home to the saloon. The drug problem is similar, but, of course, very much less flagrant. A surprising number of those who fail to meet their obligations in life are alcoholic and get into the sedimentary immobile stratum of society.

Physical Disease: Wherever criminal populations have been studied by physicians there has been found to be an excess of physical disease or defect. There is often a direct relationship between the criminal career and ill health although it is often difficult to say which one stands in a causative relationship.

Conclusion

1. From the above it would appear that criminals are handicapped persons. We have at one end of the scale cases whose difficulties are entirely due to mental disease. At the other end are pure social problems with all possible gradations in between. I would not be bold enough to place a median.

2. It seems obvious that attempts of society to handle criminals as a class by a general rule of treatment applied to all has not worked satisfactorily in the past.

3. This leads to the hypothesis that the best way to handle the problem of crime is through individual study. In certain cases this calls for elaborate psychiatric investigation, in others for equally elaborate sociological study, but in the main all offenders should have preliminary social case work carried out, in order that the needs of the individual can be brought into focus and assigned to the proper persons for treatment and care.

4. Studies of prisoners at the present moment have not resulted in startling cures, but have furnished the basis upon which better social engineering can be done. The knowledge of the personality of criminals today is far in advance of the procedures by which they are handled in any society.

5. It is to be hoped, as knowledge accumulates, that in the course of time general laws can be discovered which will enable preventive measures to be carried out on a large scale. For instance, in medicine the discovery of the infectious nature of diarrhea in children has led to the control of milk supplies in our great cities and thus practically controlled this disease which once carried off a very large percentage of children during their first year. Unfortunately, at present very few such laws are known and we are still obliged to handle each case empirically, often almost on an instinctive level.

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PRIVILEGED COMMUNICATIONS: IS JUSTICE SERVED OR OBSTRUCTED BY CLOSING THE DOCTOR'S MOUTH ON THE WITNESS STAND? *

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PHYSICIANS and surgeons are required by the ethics of their profession to preserve the secrets of their patients which have been communicated to them or learned from the inspection of symptoms and other bodily conditions. How far this ethical requirement should be enforced by law is a question on which there is much difference of opinion among both lawyers and doctors.

No state has made disclosure of confidence a crime, as it is in France, but in some the license to practice may be revoked for this cause. Seventeen states still seem to preserve the view of the English common law that there is no legal check upon the revelation of medical secrets. On the witness stand, at all events, a doctor in these states must tell all he knows.[1]

The remaining states adopt a half-way attitude towards the obligation of secrecy, of which the New York statute (first enacted in 1828) is typical.[2] Unless the patient consents, the doctor is not allowed, while testifying in court, "to disclose any information which he acquired in attending a patient in a professional capacity and which was necessary to enable him to act in that capacity." Thus there is no liability to the patient if the doctor tells every last detail in clubroom gossip or the thickly veiled items of a medical journal, but he is prohibited from divulging any of the truth in the place where it is most needed and usually most stringently required—the witness stand.

Some of these statutes make exceptions for special medical situations, such as abortion, in which disclosure is badly needed.[3] Several of the states,

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Some of this paper has previously appeared in 25 Rhode Island Medical Journal 157–163 (July, 1942). The author has been greatly aided by the classic discussion in 8 Wigmore on Evidence (3d ed. 1940) §§ 2380–2391. See also 152 Law Times 53 (1921), debates at British Medical Association; 153 Law Times 228, 252 (1922), debates at British Medico-Legal Society; 83 Law Journal 320 (1937), debates in House of Commons.

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[1] These states are Alabama, Connecticut, Delaware, Florida, Georgia, Illinois, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, Rhode Island, South Carolina, Tennessee, Texas, Vermont, and Virginia.

[2] N. Y. Civil Practice Act (1920) §§ 352, 354, as subsequently amended. See 3 Gilbert-Bliss, Civil Practice of New York Annotated (1926), §§ 352, 354; and (1941) Cumulative Supplement to same.

[3] Wigmore, § 2380, n. 5, gives full references to the statutes in the following states. The ensuing list mentions only the date of the original enactment as given by Wigmore, without regard to subsequent amendments. The statutes vary in their terms, particularly as to waiver of the privilege. The ensuing list mentions only variations of especial medical interest, including the fact of adoption of the Uniform Narcotic Drug Act (U.N.D.A.): Alaska (1913) (except for insanity); Arizona (1913) (U.N.D.A.); Arkansas (1919); California (1872) (except for mental condition and venereal disease); Canal Zone (1934); Colorado (1921); Columbia (Dist.) (1919) (U.N.D.A.); Hawaii (1925) (U.N.D.A.); Idaho (1919);

recognizing the doctor-patient privilege in general, have adopted the Uniform Narcotic Drug Act, which provides:

"Information communicated to a physician in an effort unlawfully to procure a narcotic drug, or unlawfully to procure the administration of any such drug, shall not be deemed a privileged communication." [4]

The general policy of the law is to obtain as many facts as possible about a controversy on trial, but this policy is cut into at many points by what are called rules of evidence. For instance, a witness cannot tell what he has learned from hearsay and not from his own observation, because such testimony is likely to be untrustworthy. The physician's evidence would be free from this objection, but the law often keeps out reliable testimony if it was acquired by the witness through some confidential relation. Thus a husband would hesitate to tell his wife about damaging facts and the thorough intimacy of marriage would be turned into watchful suspicion and reticence, if the law did not refuse to make her the means of his undoing.[5] Likewise a man might not consult an honest lawyer, or if he did, would tend to keep back from him anything that looked unfavorable to the case, if the lawyer could be made the leading witness against him and forced to reveal all that was told him by his client. So the lawyer cannot speak without his client's consent.[6] In many states a statute protects the secrets of the confessional [7]; and even without such legislation few lawyers would have the hardihood to ask that a priest who keeps silent be imprisoned for contempt of court.

Some doctors may feel that it is an unfair discrimination against their profession if lawyers' secrets are protected from disclosure in court and yet physicians' secrets must be laid bare. What is sauce for the goose ought to be sauce for the gander. Yet one could turn this argument for equal treatment the other way round, and deny protection in both cases. Perhaps lawyers like doctors should be forced to divulge information when the judge thinks disclosure essential to the public interest. Jeremy Bentham became white-hot against the inviolable secrecy of communications between attorney

Indiana (1926); Iowa (1897) (U.N.D.A.); Kansas (1923); Kentucky (1915); Louisiana (1928); Michigan (1915) (except for illegal marriage of persons sexually diseased); Minnesota (1913) (except for bastardy); Mississippi (1906); Missouri (1919) (except for abortion); Montana (1935) (U.N.D.A.); Nebraska (1922) (U.N.D.A.); Nevada (1912) (U.N.D.A.); New Mexico (1929) (U.N.D.A.); New York (1928) (except for narcotic investigations); North Carolina (1919) (allows presiding judge of superior court to compel disclosure when necessary to administration of justice, U.N.D.A.); North Dakota (1913); Ohio (1921) (U.N.D.A.); Oklahoma (1931) (U.N.D.A.); Oregon (1920) (U.N.D.A.); Pennsylvania (1895); Philippine Islands (1901); Porto Rico (1911) (except for malpractice, U.N.D.A.); South Dakota (1919) (U.N.D.A.); Utah (1917) (U.N.D.A.); Virgin Islands (1920); Washington (1909); West Virginia (1897) (U.N.D.A.); Wisconsin (1919) (except for lunacy and malpractice, U.N.D.A.); Wyoming (1920) (U.N.D.A.).

[4] Uniform Narcotic Drug Act, § 17, paragraph 2. This statute has been adopted in the following states and territories, of which those starred in the list do not recognize a general doctor-patient privilege: Ariz. D.C., Haw., Ia., Md.*, Mont., Neb., Nev., N.M., N.C., Oh., Okla., Ore., P.R., S.C.*, S.D., Tenn.*, Tex.*, Ut., W. Va., Wis., Wyo.

[5] See Wigmore, §§ 2332–2341.

[6] See Wigmore, §§ 2290–2329. He gives full arguments for and against this privilege in § 2291.

[7] See Wigmore, §§ 2394–2396.

and client: "Whence all this dread of the truth? Whence comes it that anyone loves darkness better than light, except it be that his deeds are evil?"

Proposals are now under consideration for extensive modifications of the attorney-and-client privilege, as Professor Edmund M. Morgan shows elsewhere.[8] However, the success or failure of these proposals ought not to affect the question whether medical secrets should be inviolable in court. The relation between lawyer and client does differ materially from the relation between doctor and patient, as I shall explain in the next paragraph. Each privilege should be judged on its own merits regardless of the fate of some other privilege. The administration of justice ought not to be shaped by interprofessional jealousies and trivial claims to prestige. Instead, we can all agree that it is a misfortune when a lawsuit is won by the party who would lose it if all the facts were known, and that we increase the risk of such a miscarriage of justice whenever we allow an important witness to keep any helpful facts away from the judge and jury. Very strong reasons should be required to justify any rule of law which keeps truth firmly concealed. Secrecy in court is *prima facie* calamitous, and it is permissible only when we are very sure that frankness will do more harm than good. With doctors' secrets as with any other kind of secrets, the only proper test is the welfare of the community. Does courtroom secrecy in the particular case produce a public good which more than offsets the risks resulting from the concealment of truth and from the lies which can be made with less fear of detection? There is no profession with a higher sense of public welfare than the doctors'; therefore, if the doctor-and-patient privilege is socially undesirable, they should be among the first to oppose it. Then they should urge its abolition wherever it exists, and object to new legislation extending it.

The reasons usually advanced for extending the privilege of silence to the medical profession are not wholly satisfactory. First, it is said that if the patient knows that his confidences may be divulged in future litigation he will hesitate in many cases to get needed medical aid. But although the man who consults a lawyer usually has litigation in mind, men go very rarely to a doctor with any such thought. And even if they did, medical treatment is so valuable that few would lose it to prevent facts from coming to light in court. Indeed, it may be doubted whether, except for a small range of disgraceful or peculiarly private matters, patients worry much about having a doctor keep their private affairs concealed from the world. Usually the patients themselves bore their casual acquaintances with full details of an operation or a disease. This whole argument that the privilege is necessary to induce persons to see a doctor sounds like a philosopher's speculation on how men may logically be expected to behave rather than the results of observation of the way men actually behave. Not a single New England state allows the doctor to keep silent on the witness stand. Is there any evidence

[8] Morgan, "Suggested Remedy for Obstructions to Expert Testimony by Rules of Evidence," (April 1943) 2 Clinics 1627; (April 1943) 20 U. of Chi. L. Rev.

that any ill or injured person in New England has ever stayed away from a doctor's office on that account?

The same *a priori* quality vitiates a second argument of the framers of the New York statute about the evils of compelling medical testimony: "During the struggle between legal duty on the one hand and professional honor on the other, the latter, aided by a strong sense of the injustice and inhumanity of the rule, will in most cases furnish a temptation to the perversion or concealment of the truth, too strong for human resistance." Has any member of the numerous medical societies in New England observed such a tendency among New England doctors to commit perjury for the sake of "professional honor"?

There is far more danger of perjury if the physician cannot testify, only it will be perjury by the patient. In many states where the privilege exists, an unscrupulous plaintiff in an accident case can exaggerate the injury without fear of contradiction by the doctor whom he consulted right after the accident. The patient can tell the sad story of his injuries to judge, jury, and spectators, and then he can object that it would violate his bodily privacy if the doctor were allowed to take the stand and testify that the accident had left no traces one hour after it occurred. Fortunately, there is some limit to this absurdity. Most courts hold that if the patient goes into the details of his injuries, then he has waived his privilege; he has thrown open the whole question of his bodily conditions.[9] Otherwise he could make the statute both a sword and a shield.

Yet this rule about waiver does not promote truth-telling any too well. The patient may tell some rather big lies about his health without "going into details," and the courts are by no means clear in defining the point where details begin. There is also abundant confusion on the question whether what the patient says under cross-examination opens the door for his doctor to testify. Some courts hold that cross-examination is not a waiver like direct testimony, because the patient does not now speak willingly. By this view, the opposing lawyer who ventures to ask the patient any questions may find the witness going into the most intimate details without regard to either privacy or truth, and yet the lawyer will be helpless to contradict this highly colored story by calling the physician.

The absurdity of this solicitude for the patient's privacy is illustrated by a recent Ohio case.[10] The plaintiff sued the owner of a building for heavy damages, charging that the defendant negligently suspended a fire hose from the building in such a manner that a violent wind caused the hose to break a window, knocking glass against the plaintiff. He testified that since this accident he had suffered loss of weight, severe and chronic headaches, failing eyesight, insomnia, facial paralysis, and inability to walk normally; but that

[9] The cases are collected in 114 American Law Reports Annotated 798 (1938). (This series will be hereafter cited as A.L.R.) See also Wigmore, § 2389.

[10] *Harpman v. Devine*, 133 Oh. St. 1, 10 N.E. (2d) 776 (1937), discussed in 11 U. Cinc. L. Rev. 544.

before the glass hit him his general condition was "very good." On cross-examination he admitted that he had consulted various physicians before the accident. The defendant called one of these doctors for the purpose of showing that the plaintiff was suffering from anemia before the accident. The court refused to allow the doctor's evidence "in view of the very delicate and confidential nature of the relation."

Another argument for the privilege is that employees are often treated after accidents by physicians who are in charge of the company hospital or otherwise dependent upon the good will of the employing corporation. It was urged to legislatures that some of these physicians were taking advantage of their position to obtain from the patients information which would tend to defeat a claim for damages. This argument has the merit of not being abstract, but of asserting a basis in fact. Even if true, it might be wiser to admit the evidence of the physicians, trusting in the jury to discount it heavily if an improper attitude towards the patient exists.

Where the statutory privilege is in force, what is its scope? In the first place, what sort of medical person is included? [11] Any licensed physician or surgeon falls within the statute, and this applies to hospital physicians though they are not specifically selected by the patient.[12] There is no privilege for communications to unlicensed practitioners. Thus mental healers, chiropractors and osteopaths can be forced to disclose communications from their patients, unless perhaps their professional status is expressly recognized by law. How about the numerous assistants who surround doctors under modern conditions? Many attempts have been made to prevent nurses from telling about their patients, but these have usually failed.[13] Most courts say that if public policy demands the extension of the privilege to nurses and other hospital attendants, then the change in the law should be made by the legislature, not by judicial action. Here is an enticing invitation to organizations of nurses to increase their professional prestige by lobbying for a statutory amendment which will put them on the same high level of secrecy as doctors. This result has already been accomplished in New York and a few other states. Dentists may also resent being left out in the cold with druggists. And the privilege does not apply to an unlicensed "orthopedist" who is teaching gymnastic exercises taken by medical advice.[14] Those psychoanalysts who have been too busy to study medicine must have spicier facts to relate than physicians, but no court has yet bound them to secrecy. The status of veterinarians was raised in an Iowa suit brought by the owner of a race horse against the Western Union for delay in transmitting a telegram, "Bravo is sick; come at once." The doctor arrived at last, but Bravo died. The Western Union lawyer asked the doctor what the owner said to him about Bravo's symptoms. The owner urged that

[11] The cases are collected in 68 A.L.R. 176 (1930); Wigmore, § 2382.
[12] The cases are collected in 22 A.L.R. 1217 (1923); 72 U. S. Law Rev. 619 (1938).
[13] The cases are collected in 39 A.L.R. 1421 (1925); 68 A.L.R. 177 (1930). On hospital attendants, see 22 Marquette L. Rev. 211 (1938).
[14] *Laurie Co. v. McCullough*, 174 Ind. 477, 19 N.E. 1014 (1909).

the communications from Bravo to the veterinary were privileged, but the court held that veterinarians were not covered by the statute.[15]

No end of trouble has arisen about the admissibility of medical records. If a doctor cannot tell the court what he saw, then the hospital records in which he wrote down what he saw seem logically just as unavailable. Yet some courts are impressed by the fact that the law requires such records to be kept, and see little sense in this if they cannot be used for the sake of attaining justice.[16] For example, it would be absurd if the records of a state hospital for the insane could not be consulted in a will contest for their bearing on the mental capacity of the testator.[17] So judges have been inclined to read a wide exception into the statute to cover such situations. Thus death certificates ought to be admissible.[18] In New York this exception has been extended to public health records, which were admitted to show that the defendant was a typhoid carrier who had been warned not to participate in the service of food. The records were used to establish her liability in damages to the estate of a man who died of typhoid after eating food which had passed through her hands.[19]

How about autopsies? It is generally held that if the doctor had not attended the person during his lifetime, then the doctor can testify about performing an autopsy because the relation of the physician and patient did not exist.[20] "A deceased body is not a patient." [21] For example, a man who carried heavy accident insurance became suddenly ill. The physician who was called removed him to a hospital and there continued to treat him until his death. The hospital pathologist was then summoned to perform an autopsy, which showed that the man died from the effect of wood alcohol in home-made gin. The first doctor was allowed merely to give his opinion that wood alcohol in gin was capable of causing the death, but the second doctor was permitted to give all the details discovered during the autopsy.[22] However, another court regarded this device of getting away from the privilege by switching doctors as an arrant subterfuge and ruled out the autopsy by asking:

"Can a hospital, immediately after the death of one of its patients, discharge the physician who had attended the patient up to the time of death, and thereafter rush the dead body to the morgue, and direct the physician at the head of the pathological department to perform an autopsy, and thus evade the statute which sealed the lips of the first physicians? We think these questions should be answered in the negative, and that a physician

[15] *Hendershot v. Western Union Telegram Co.*, 106 Iowa 529, 76 N.W. 828 (1898).
[16] The cases are collected in 75 A.L.R. 393 (1931); 120 A.L.R. 1140 (1939).
[17] *Liske v. Liske*, 135 N. Y. Supp. 176 (1912).
[18] Yet some courts exclude them. See the authorities in Wigmore, § 2385*a*; 17 A.L.R. 370 (1922); 42 A.L.R. 1455 (1925); 96 A.L.R. 341 (1935).
[19] *Thomas v. Morris*, 286 N. Y. 266, 36 N.E. (2d) 141 (1941), annotated in 136 A.L.R. 856.
[20] The cases are collected in 58 A.L.R. 1134 (1929); 35 Law Notes (N. Y.) 87 (1931).
[21] See case cited in note 22 *infra*.
[22] *Travelers' Ins. Co. v. Bergeron*, 25 F. (2d) 680 (C.C.A. 8th, 1928).

under such circumstances steps into the shoes of the attending physician, and must be treated as if he were the assistant of the attending physician, holding the autopsy at the direction of the latter, and that the information acquired by him through the autopsy is privileged." [23]

The question what part of the physician's knowledge about the patient is non-professional raises great difficulties. The fact that he was ill, the number of visits made, the performance of an operation at a certain date may be disclosed, but not the nature of the illness or the operation. It would seem that symptoms which were obvious to every one without medical inspection cannot be said to be disclosed in confidence, but several cases have forbidden hospital doctors to testify that when a man was brought in they smelled liquor on his breath or observed other common symptoms of intoxication.[24]

The information must be received in a professional relation; not everything medical which a doctor sees or hears is privileged. For example, if called to a house to see a person, the doctor can sometimes tell what he incidentally observed as to the health of other members of the family.[25] If the patient voluntarily employed the physician, the privilege is clear. But suppose the doctor renders first aid to an unconscious man. No confidence is reposed, but the doctor does attend him in "a professional capacity." In a New York case a physician was called by a hotel to attend a guest without the latter's knowledge. The man said he had taken poison, but cursed the doctor and refused to have anything to do with him. The doctor administered a hypodermic. The hotel guest was held to be a patient, although he did not want to be, and the doctor was forbidden to tell about the poison in order to show that the patient had forfeited his life insurance by committing suicide.[26]

Even though a professional relation exists, only information necessary to enable the doctor to act in that capacity is privileged. Matters which are entirely distinct from medical facts may be disclosed,[27] for instance, the patient's remarks about his will. An Indiana doctor was called to attend a sick wife and also cast a professional eye on her husband. While leaving the house, he heard the husband say "I will get her yet, damn her; I will get her yet." Shortly afterwards the wife shot her husband. When tried for murder, she called the doctor as a witness to support her story that she killed her husband in self-defense while he was approaching her with an open knife in his hand. The trial court excluded the doctor's evidence on the ground that he was in the house in the capacity of a physician. The jury disbelieved the wife's story and she was convicted of manslaughter. The

[23] *Matthews v. Rex Health and Ins. Co.*, 86 Ind. App. 335, 157 N.E. 467 (1927).

[24] The cases are collected in 79 A.L.R. 1131 (1932).

[25] *Jennings v. Supreme Council*, 81 N. Y. App. Div. 76, 81 N. Y. Supp. 90 (1903). See *Nichols v. State*, 109 Neb. 335, 191 N.W. 333 (1922).

[26] *Meyer v. Knights of Pythias*, 178 N. Y. 63, 70 N.E. 111 (1904).

[27] The cases are collected in 24 A.L.R. 1202 (1923); Wigmore, § 2383; 13 Wash. L. Rev. 141 (1938).

upper court reversed, holding that the doctor should have been allowed to testify about threats of death though not about health.[28]

Often the illness and another fact are closely connected, as in a New York divorce trial which received much attention in the press 20 years ago, in which a physician was asked to disclose a communication from the misguided wife as to the paternity of an expected child. The referee excluded this communication, because it must have been given as a sequel to the wife's disclosure of her pregnancy, which was clearly privileged and could not be repeated. On the other hand, a California doctor was allowed to testify that while he was delivering an illegitimate child a certain man was present and admitted that he was the father.[29] A similar problem arises when the victim of an accident in describing his symptoms to a physician throws in occasional statements about the way he was hurt. Of course, the speed of the trolley car which hit him and the fact that he himself was not looking as he crossed the street are not really necessary for the application of surgical dressings, and the legitimacy of an expected child has no bearing on the medicines or other pre-natal care which should be given to the mother. (If the doctor were a psychiatrist, who was curing her of melancholia or some other mental or nervous disorder, questions on such a fact would be highly important.)

Logically, it may be that the facts leading up to a physical condition are often not "necessary to enable the physician to act in a professional capacity" and consequently are not protected by the statute. Yet practically it is very unjust to a patient, consulting a physician in a state where the law insists that the utmost confidence shall be preserved, if his conversations with the physician can be sifted out by the law into two classes of utterances and only one class is kept secret. Here comes a sentence which is held necessary for treatment; but the next, dealing only with the cause of the ailment, receives no protection. The dividing line may fall in the middle of a sentence. What sort of confidence is secured by the statute if a sick and perhaps hysterical patient must be constantly on the alert, every time a question is asked him, to determine at his peril whether it is necessary for treatment, and, even if it is, must be watchful lest he add something to his answer which is not necessary? If the privilege is to exist at all, the law might well take the position that all the communications of the patient which are actuated by his feeling of confidence in his medical adviser and which he would naturally make in furnishing the doctor with information as a basis of treatment are entitled to secrecy, even though some of these facts if wrenched from the conversation and taken singly have no medical value. A patient should not be forced to tell his story to the doctor with the circumspection of a lawyer drawing pleadings.

The privilege belongs to the patient and not to the physician. Hence the patient cannot be forced to testify about the consultation any more than the

[28] *Meyer v. State*, 192 Ind. 542, 137 N.E. 547 (1922).
[29] Baird's Estate, 173 Cal. 617, 160 Pac. 1078 (1916).

doctor. Conversely, if the patient consents to the disclosure, the doctor can no longer insist on remaining silent. Is anything less than express consent enough? The effect of the patient's testifying about his own health has already been discussed. Suppose the plaintiff in a personal injury case, who has been to several doctors, calls only one physician who is favorable to his own claim; can the plaintiff still insist that it might cause him "embarrassment and disgrace" if the defense were allowed to put on his other doctors who are ready to tell a very different story about the plaintiff's bodily condition? As to this the cases are in great confusion.[30]

Sometimes the patient is dead and can no longer waive his privilege. Must the doctor's lips then be sealed forever? Some statutes have neglected to provide for this emergency, whereas others expressly permit the executor or administrator of the patient to authorize the doctor to speak.[31] Yet no matter how carefully the statute be drawn, it is likely to fail to specify some person connected with the decedent who has an excellent reason for desiring the doctor's testimony. For example, in a Wisconsin case a widow suing as a beneficiary under an accident insurance policy was unable to prove that her husband's death was accidental except by the testimony of the physician who attended him. The Wisconsin statute did not say that a beneficiary could waive the privilege. Hence the court forced the doctor to keep silent, and the widow recovered nothing on the policy.[32] Here the privilege, which is supposed to exist for the patient's benefit, operated to defeat one of his dearest desires. Wigmore's view that nobody except the patient may take advantage of the privilege would have accomplished a just result in this case. Certainly a person directly antagonistic to the patient should not profit from the privilege. Many insurance policies endeavor to avoid such difficulties by a clause in which the insured waives the privilege in advance. Such a clause is usually held valid, but it has no effect in New York.[33]

The possibility that the patient's death silences the doctor is particularly objectionable when the patient was murdered. It may be very important to have a physician disclose the physical condition of the victim during the interval between the crime and the death. Sometimes a man kills a woman to get her out of the way because she is expecting a child and medical testimony is necessary to establish his motive. Judges usually get around this difficulty by saying that criminal cases are not within the spirit of the statute, although some courts refuse to carve out such an exception.[34] Usually the desired testimony relates to the bodily condition of the victim, but it may conceivably concern that of the accused and here the bars have been higher.[35]

[30] 62 A.L.R. 680 (1929); 90 A.L.R. 646 (1934); 51 Harv. L. Rev. 1931 (1938); 31 Yale L. J. 529 (1922).

[31] The cases are collected in 31 A.L.R. 167 (1924); 126 A.L.R. 380 (1940); Wigmore, § 2391.

[32] *Maine v. Maryland Casualty Co.*, 172 Wis. 350, 178 N.W. 749 (1920) two judges dissenting; annotated in 15 A.L.R. 1544.

[33] The cases are collected in 54 A.L.R. 412 (1928); Wigmore, § 7*a*.

[34] The cases are collected in 45 A.L.R. 1357 (1926); Wigmore, § 2385.

[35] *People v. Murphy*, 101 N. Y. 126, 4 N.E. 326 (1885).

Suppose a murder on a dark street. A policeman testifies that he could not recognize the killer, but that he shot at him as he was running away and winged him in the left arm. The prosecution calls a physician for the purpose of having him testify that one hour after the murder the accused called at his office and was treated for a bullet-wound in his left arm. The accused objects on the ground that he does not want to lay his ailments bare to the public. It is by no means certain on the authorities that the doctor would be allowed to testify, and so the prisoner might be acquitted for inability to identify him with the murderer.

A similar but much more perplexing conflict of loyalties was presented to Dr. C. E. May of Minnesota. While Dillinger, the former Public Enemy No. 1, was fleeing from prison, he went to Dr. May to be treated for gunshot wounds incurred during his escape. Was Dr. May ethically bound as a physician to preserve secrecy or was he under a duty as a citizen to notify the police? In fact he neglected to inform the police of his ministrations and was consequently imprisoned two years for harboring a fugitive wanted under a federal warrant.[36] *The Lancet* commented that "colleagues in every country will applaud his action in not betraying a professional trust." [37] Not many laymen are likely to join in the applause.

The Code of Evidence recently published by the American Law Institute, which Professor Edmund M. Morgan discusses elsewhere,[38] was originally drawn without any privilege for medical secrets in court.[39] At the last minute lawyers from states which have the privilege in their statutes forced the draftsmen of the Code to insert three new sections (§§ 221–223) establishing the physician-patient privilege. Fortunately, numerous limitations are specified which will prevent a repetition of many of the miscarriages of justice which I have already described. It may be argued in defense of the Code that these limitations greatly improve the law in states where the privilege now exists, and that they cut it down to so little that it will do no harm. Nevertheless, the American Law Institute might better have followed Hamlet's advice to the players, "O reform it altogether." In the first place, no matter how numerous and careful the limitations, some new situation is bound to arise in which secrecy ought not to be maintained, and yet the Code will prevent disclosure because the draftsmen in 1942 could not foresee this situation and so failed to insert any limitation to take care of it. Secondly, although the Code will make the law better in states which now have the privilege, it will make the law worse in states which have hitherto let in the truth. The powerful influence of the American Law Institute is likely in time to cause the general adoption of the Code in all the states, including those which now reject the doctor-patient privilege without apparently suf-

[36] 32 Mich. L. Rev. 1164 (1934).
[37] 226 Lancet 1183 (June 2, 1934).
[38] Morgan, "Suggested Remedy for Obstructions to Expert Testimony by Rules of Evidence," (April 1943) 2 Clinics 1627, (April 1943) 20 U. of Chi. L. Rev.
[39] See Proposed Final Draft (March 16, 1942, submitted to the Annual Meeting, May, 1942).

fering any consequent lack of medical care. Thus truth will be curtailed in regions where it is now available to make lawsuits end justly. And for what corresponding gain? In Massachusetts, for instance, the doctor is now protected by the trial judge against needless disclosures and told to speak out when truth is important. If Massachusetts should enact the Code of Evidence, many hours and many dollars will be spent on the intricacies of this new privilege,[40] and sooner or later some badly needed testimony will be lost but what will health gain? Does anybody seriously believe that the Massachusetts General Hospital or the Boston Lying-in or the Back Bay doctors will suddenly rise to new heights of excellence because now patients can throng to them assured that if they ever get into litigation a few of their medical secrets will occasionally be hidden from the prying curiosity of judges and jurors?

Legislatures and courts have been occupied for over a century in closing the physician's mouth in the very place where the truth is badly needed. And yet the much more important obligation of his silence in private life has hardly been considered by the law at all. We have put our money on the wrong horse. In the few instances in which honest patients do dread disclosure of their physical condition by a doctor, their fear is not that the truth may some day be forced from him in court, but that he may voluntarily spread the facts among his friends and theirs in conversation; and against this really dangerous possibility the statutes give almost no protection. The first and only decision on the doctor's liability to pay damages to his patient for a breach of confidence was made in 1920, under the common law, and recovery was denied, although a possible liability under different circumstances was suggested by the Nebraska court.[41]

A guest of a small hotel in a Nebraska town consulted a doctor who diagnosed his ailment as syphilis. He told the patient of the danger of communication and got his promise to leave the hotel the next day. On that day the doctor made a professional call on the owner of the hotel, and on finding that the patient had not moved out he warned the owner that the man had "a contagious disease." The patient was forced to leave the hotel, and sued the doctor for disclosing medical secrets.

Before discussing this unusual cause of action, let us see what would have happened if the patient had instead sued for slander. Since the diagnosis was perhaps incorrect the doctor might have been liable for slander, because of the defamatory nature of his statement. Yet the doctor might have raised the defense that there is no duty to pay damages for a slanderous statement if it is made honestly and on reasonable grounds in pursuance

[40] The New York doctor-patient statute (C.P.A. § 352) is eight lines long, and it takes six pages of small type just to summarize briefly the judicial decisions interpreting these eight lines. 3 Gilbert-Bliss, Civil Practice of New York Ann. (1926) pp. 281–285; and 1941 Cumulative Supplement to same, pp. 192–194. The summaries of medical cases under § 354 occupy at least two pages more.

[41] *Simonsen v. Swenson,* 104 Neb. 224, 177 N.W. 831 (1920); annotated in 9 A.L.R. 1254, 20 Col. L. Rev. 890, 34 Harv. L. Rev. 312, 30 Yale L. J. 289, 75 J. Am. Med. Assn. 1207. See also *Smith v. Driscoll,* 94 Wash. 441, 162 Pac. 572 (1917).

of a duty. For example, if a doctor is required by law to report certain diseases to the Board of Health and makes such a report honestly but mistakenly, he is not liable for slander. But should he be protected if he volunteers false statements to a private person? Suppose, on the other hand, that the doctor's diagnosis was correct, so that he told the truth to the hotel-keeper. Then he would not be liable for slander, since truth is a defense in that kind of suit.

But the actual suit was not for slander; it was for violation of the physician's contractual obligation to remain silent about his patient. Can the truth be told with impunity if a confidential relation is thereby violated? The Nebraska court thought that a doctor ought to pay damages for telling the truth in breach of his duty to his patient, but that he should have the same right as a man who is sued for slander to insist that he acted under a duty to make the disclosure, which was more important than the duty to keep silent. Clearly his statutory obligation to make health reports would justify breaches of confidence therein. Here, however, he was under no legal obligation to divulge his patient's disease; but the court decided that in view of the great danger to life resulting from silence he had a moral obligation to speak which overrode his duty of secrecy. Consequently, the patient lost his case.

Much can be said for and against this result. One commentator says that the Nebraska case "stands for the triumph of medical altruism over legal duty." Certainly, disclosure of risks of infection is very desirable; but it would be wiser to require all contagious diseases to be reported to a public official, who should have power to take all steps necessary to protect people from the patient, whether this required publicity or his removal to a hospital. There are obvious dangers in leaving it to every physician to determine whether circumstances justify him in betraying intimate confidences.

In conclusion, the law would seem to have directed its attention to the wrong quarter in laying so much emphasis on silence in the court and neglecting until now the patient's rights against disclosures to the world in general.

CONTRACTS NOT TO PRACTICE MEDICINE *

By E. MERRICK DODD,† *Cambridge, Massachusetts*

INTRODUCTION

A PHYSICIAN who has been practicing successfully in a certain small city and whose patients include residents of the city and of the neighboring countryside, sells his practice to a younger man and agrees that he will not thereafter practice medicine within a 25 mile radius of his former office.

A dentist with a similar established practice hires a younger dentist as his assistant and the latter agrees that if he ever leaves the former's employ he will not practice dentistry within a 10 mile radius.

The doctor who sold his practice, expecting to live thereafter on the proceeds of the sale, finds those proceeds inadequate and resumes practice in the same city in violation of his promise. The young dentist, after making an unsuccessful attempt to practice in some other city where he is unknown, returns to the city in which his former employer is practicing and opens an office there in violation of his promise.

I presume that most doctors and dentists would be surprised to learn that either of these supposed cases presents any problem for the lawyer. The contracts have been broken; what problem can there be for the law except that of finding the most effective means of giving the injured party an adequate remedy for the wrong that he has suffered? But the matter, as we lawyers know, is not quite so simple as that, for we must reckon with a long established and still vigorous doctrine of the common law—the doctrine that contracts in unreasonable restraint of trade will not be enforced by the courts.

It is probably safe to assume that when the average educated American who is not a lawyer reads the words "contracts in restraint of trade" there comes to his mind a picture of a great industrial combination which is seeking by means of restrictive agreements to obtain a monopoly in some line of business enterprise. The words will cause him to think of the Sherman Anti-trust Act and of dramatic struggles by Assistant Attorney General Thurman Arnold and his aides against a battery of corporation lawyers. If such a reader thinks of the medical profession at all he will think of the recent conviction of the American Medical Association for engaging in a conspiracy in restraint of the trade of Group Health, Inc.[1] He will be unlikely to see any connection between restraint of trade as he conceives it and the contracts to which we have referred.

"Contract in restraint of trade" is not, however, a phrase invented by a nineteenth century Congress as a method of curbing the growth of monopolistic business combinations. It is a phrase which has been used by com-

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[1] *American Medical Association v. United States*, 63 Sup. Ct. 326 (1943).

mon law lawyers for centuries—a phrase which was already old when the Court of Kings Bench dealt with the legality of such contracts at length in the case of Mitchel v. Reynolds,[2] decided in 1711.

The general principle announced in that case is as follows:

"In all restraints of trade, where nothing more appears, the law presumes them bad; but if the circumstances are set forth, that presumption is excluded, and the Court is to judge of those circumstances, and determine accordingly; and if upon them it appears to be a just and honest contract, it ought to be maintained."

The court stated its objections to contracts which attempt to impose drastic restrictions on the contracting party's right to continue in business as follows:

"The true reasons of the distinction upon which the judgments in these cases of voluntary restraints are founded, are, first, the mischief which may arise from them, 1st, to the party, by the loss of his livelihood, and the subsistence of his family; 2d to the publick, by depriving it of an useful member.

"Another reason is, the great abuses these voluntary restraints are liable to; as for instance, from corporations, who are perpetually labouring for exclusive advantages in trade, and to reduce it into as few hands as possible; as likewise from masters, who are apt to give their apprentices much vexation on this account, and to use many indirect practices to procure such bonds from them, lest they should prejudice them in their custom, when they come to set up for themselves.

"3dly, because in a great many instances, they can be of no use to the obligee; which holds in all cases of general restraint throughout England; for what does it signify to a tradesman in London, what another does at Newcastle? and surely it would be unreasonable to fix a certain loss on one side, without any benefit to the other." [3]

The general principles enunciated in Mitchel v. Reynolds have remained substantially unchanged after more than two centuries, although judicial notions of when a contract in restraint of trade is a "just and honest contract" (or is "reasonable" to use the more modern phraseology) have been modified somewhat to suit changing conditions and changing conceptions of economic and social policy.

Contracts by the Seller of a Practice Not to Compete with the Buyer. a. Validity. Long before the courts were called upon to consider contracts for the sale of a medical practice, they had established certain rules with respect to contracts for the sale of a business. Even prior to the case of Mitchel v. Reynolds it had been held that a contract by the seller of a business not to compete with the buyer in a limited area was valid.[4] An agreement between

[2] 1 P. Wms. 181 (1711).
[3] 1 P. Wms. 181, 190 (1711).
[4] *Rogers v. Parry* (1614) 2 Bulst. 136. It is not mere antiquarianism which leads lawyers to cite seventeenth century cases in twentieth century articles. The common law of today is affected by early precedents in a manner which has no parallel in medicine.

one who is selling his business and the purchaser that the former will not compete with the latter has obvious advantages for the buyer. If the business is to be carried on by him at the old place and under the old trade name, he will reasonably expect that many of the seller's former customers will transfer their custom to him. That expectation would be seriously impaired if the seller were free to compete and to urge his former customers to continue to trade with the same man rather than to continue to trade at the same store.

It is equally clear that the seller will ordinarily be able to obtain a better price for his business if, by making a legally binding agreement not to compete, he can insure the buyer against the risks involved in his continued competition. The court's view that such contracts, if reasonably restricted as to area, should be deemed valid is, therefore, unexceptionable. Such contracts are usually advantageous to both buyer and seller, and they do not ordinarily seriously injure the public by restricting competition. One competitor in the trade—the seller—drops out, but his place is taken by the buyer, often a newcomer in the trade.[5]

The objection that the older cases made to contracts which prohibited the buyer from engaging in the same line of business anywhere in England was equally sound. Until recently business was a local affair and, as the court said in Mitchel v. Reynolds[6]: "What does it signify to a tradesman in London what another does at Newcastle?" Unfortunately, some modern courts have adhered to the old rule despite changed conditions and have held that agreements not to compete, which cover an entire state, are invalid even though they are made in connection with the sale of a business which has a statewide or even a nationwide clientele.[7] A few state legislatures have unwisely enacted statutes which so provide.[8] Happily, such statutes are comparatively rare, and most of those modern courts which are unhampered by statute have held that the proper test is whether the restraint is no wider than the area of the business, not whether it is narrower than the boundaries of the state.[9]

The question whether a contract which is unlimited in time is reasonable has also given the courts some trouble, but there is little or no dissent today from the proposition that the fact that a contract not to engage in business is unlimited as to time does not necessarily invalidate it, though the fact does have a bearing on the decision of the crucial question—whether the contract is unreasonable because more restrictive than is necessary to assure to the

[5] The contract is, however, valid at common law even though the buyer was already engaged in the same line of business in the same locality so that the contract did in fact reduce the number of competitors.

[6] 1 P. Wms. 181 (1711).

[7] See *R. L. Parish v. Schwartz,* 344 Ill. 563 (1931). The contract did not relate to the sale of an entire business but to the sale of a large block of shares in a corporation by two of its officers. Three judges dissented.

[8] See California Civ. Code, §§ 1673–1675; 15 Oklahoma Stat. Ann. §§ 217–218. These statutes limit the permissible area to "a specified county, city or part thereof."

[9] See 5 Williston on Contracts (Rev. Ed. 1937) § 1639 and cases cited. The problem does not seem to have arisen with respect to sales of a medical or dental practice.

buyer the goodwill of the business which he has purchased.[10] Contracts which, if literally construed, would be unlimited as to time are often construed as limited to a reasonable time and upheld as so construed.

It is by no means obvious that contracts for the sale of a medical practice ought to be treated by the courts in the same manner as contracts for the sale of a business. No doubt the interests of the seller and the buyer of a practice are substantially the same as those of the seller and the buyer of a grocery store. In each case the seller wants to get the highest possible price for what he sells, which he cannot do unless he can make an agreement that will protect the buyer against the seller's competition. In each case the buyer wants that protection—even more strongly perhaps in the case of the purchase of a medical practice. A doctor who is selling his practice is likely to have much closer personal relationships with his patients than a grocer has with his customers, so that his continuing competition is likely to be more dangerous to the buyer than would be the case in the grocery business.

On the other hand the interest of the public in having the seller free to continue his activities is much greater in the case of doctors than of grocers. So much of medicine is a matter of understanding the individual patient's physical, mental and moral characteristics rather than of professional skill in the abstract that there is a very real loss to the patients of an experienced physician when he retires from practice, even where he sells his practice to one of equal ability. If the selling physician later wants to resume practice, there is a very real hardship on his patients if he must refrain from doing so because of a contract that he has previously made.

An agreement by a member of a healing profession that he will no longer heal the sick in the same community is one for which those who like to think of the medical profession as concerned primarily with community service and only incidentally with the pursuit of gain are likely to feel considerable distaste. Nevertheless, it would probably have been unwise for the courts, in the absence of any indication that the community or the medical profession regards a doctor's agreement not to compete with the purchaser of his practice as anti-social, to refuse to accord legal validity to such an agreement.

At all events, the courts have determined the validity of an agreement by a doctor or a dentist not to compete with the purchaser of his practice by the same standards which they apply to determine the validity of a similar agreement by a grocer. By applying such standards they have in almost every case held such contracts valid.[11] Few, if any, such contracts have been

[10] See 5 Williston on Contracts (Rev. Ed. 1937) § 1638 and cases cited.

[11] The cases upholding such contracts are numerous and the following list is not exhaustive. In most of them the contract was held to be not only valid in law but enforcible in equity by injunction.

(a) Contracts by a physician or other medical practitioner not to compete with one who is purchasing his practice:

Doty v. Martin, 32 Mich. 462 (1875) (unlimited contract not to practice in vicinity of Maple Rapids); *Wilkinson v. Colley*, 164 Pa. 34, 30 Atl. 286 (1894) (contract not to practice within 8 miles of Lehman Centre for 10 years); *Gordon v. Mansfield*, 84 Mo. App. 366

found to exceed the proper space limitations; and most courts hold that no time limitation is necessary.[12] In one unusual case the contract not to compete was made by the buyer instead of by the seller. The former, a proctologist, had purchased a sanatorium in Omaha from the latter and had gone into possession, but had paid only a small part of the purchase price. He agreed that if he failed to pay the balance, he would not practice medicine within 150 miles of Omaha. The agreement was held valid.[13]

b. The purchaser's remedies. If the seller's agreement not to compete is legally valid and is broken by him, the buyer is, of course, entitled to the ordinary remedy for breach of contract—an action at law for damages. Such a remedy is, however, an unsatisfactory one. It is impossible to determine the amount of the damages which the buyer of a business or of a professional practice suffers by reason of the seller's competition. Moreover, the bringing of an action for damages is not likely to put an end to the competition. Since damages in an action at law are limited to those suffered up to the date of the beginning of the action, the buyer would, in case the seller's competition continued, be obliged to bring a series of actions for damages in order to get any effective relief.

A much more effective remedy than that of damages is an injunction against the continuation of the wrongful competition. This remedy can, in those states which adhere to traditional procedural methods, be obtained only by bringing a suit in equity rather than an action at law. Equitable remedies are not given as a matter of right but as a matter of judicial discretion. The plaintiff in a suit for equitable relief must convince the court that he needs the aid of equity because any legal remedy which he may have

(1900) (unlimited contract not to practice in county); *Wolff v. Hirschfeld*, 23 Tex. Civ. App. 670, 57 S.W. 572 (1900) (contract not to practice within 10 miles of Marion for 10 years); *Ryan v. Hamilton*, 205 Ill. 191, 68 N.E. 781 (1903) (unlimited contract not to practice within 8 miles of Viola); *Threlkeld v. Steward*, 24 Okla. 403, 103 Pac. 630 (1909) (contract not to practice within 10 miles of Allen for 2 years); *Mills v. Cleveland*, 87 Kan. 549, 125 Pac. 58 (1912) (contract by proctologist not to practice anywhere in the United States, broken by resuming practice in the same locality; a dubious decision in view of the scope of the contract); *Scott v. Asbury*, 198 S.W. 1131 (Mo. App. 1917) (unlimited contract not to practice within 10 miles of Marceline); *Rowe v. Toon*, 185 Ia. 848, 169 N.W. 38 (1919) (contract not to practice in county for 10 years); *Clabaugh v. Haebner*, 236 S.W. 396 (Mo. App. 1922) (unlimited contract not to practice in Green Ridge and vicinity); *Randolph v. Graham*, 254 S.W. 402 (Tex. Civ. App. 1923) (unlimited contract not to practice within a 20-mile radius); *Johnson v. McIntyre*, 309 Pa. 191, 163 Atl. 290 (1932) (contract not to practice within a 15-mile radius for 15 years); *Johnson v. Stembo*, 271 Ky. 301, 126 S.W. (2d) 165 (1938) (contract by a physician not to operate a hospital in the county in competition with a hospital which he was selling).

(b) Similar contracts by dentists:

Dills v. Doebler, 62 Conn. 366, 26 Atl. 398 (1892) (contract construed to permit resumption of practice on payment of a stipulated sum); *Socke v. Murdock*, 20 N. Mex. 522, 151 Pac. 298 (1915) (contract not to practice in Springer for five years); *Wall v. Chapman*, 84 Okla. 114, 202 Pac. 303 (1921) (contract not to practice in city for five years); *Miller v. Eller*, 192 Iowa 147, 183 N.W. 498 (1921) (contract not to practice in town for 25 years).

[12] But cf. *Rakestraw v. Lanier*, 104 Ga. 188, 30 S.E. 735 (1898) (partnership agreement by physician not to practice within 15-mile radius after expiration of partnership held invalid because not limited as to time); *Mandeville v. Harmon*, 42 N.J.Eq. 185 (V.C. 1886) (contract by physician not to practice in Newark at any time after the termination of his employment said to be of doubtful validity; injunction against breach refused.

[13] *Tarry v. Johnston*, 114 Neb. 496, 208 N.W. 615 (1926).

is inadequate. But since the only remedy at law which the buyer of a practice has against a seller who violates his agreement not to compete is an action for damages, and since that remedy is inadequate for the reasons above stated, the plaintiff's claim to the equitable remedy of an injunction is one which makes a very strong appeal to the courts. If a promise made by the seller of a medical practice to the buyer that the former will cease to practice medicine is sufficiently limited in scope, if such promise is broken by the seller, and if the buyer seeks equitable relief by injunction instead of suing at law for damages, the injunction will be granted almost as a matter of course.[14]

c. Implied agreements not to compete. Doctors, like other people who make contracts, do not always express their meaning completely in the words of the agreement which they sign. It not infrequently happens that a doctor agrees to sell his practice to another without any explicit statement as to whether the seller is to refrain from competition with the buyer. Does such a sale imply an agreement not to compete?

The same problem has frequently been presented to the courts in the case of the sale of a commercial business. A large majority of the courts have held that even where the contract for the sale of the business specifically states that the subject matter of the sale includes the good-will of the business, the buyer is free, nevertheless, to start a competing business next door and to serve his former customers, provided he does not personally solicit those customers to continue to deal with him and confines his efforts to attract their patronage to advertisements addressed not to them but to the community in general.[15] This narrow view of what is meant by the sale of the good-will of a business has been justly criticized. It is a fundamental principle of the law of sales that the seller of anything will be treated as impliedly agreeing not to derogate from his own grant. Translated from legal jargon into plain English, this means that the courts will not permit a seller to do something inconsistent with what is fairly implied by his agreement of sale. It is because of that principle that the courts have held that the seller of a business will not be permitted to solicit the business of his old customers by such methods as informing them that he is resuming business at a new address and hopes for their continuing patronage.

Such a limitation on the buyer's rights is wholly inadequate. The seller's goodwill, which he has expressly or impliedly sold, consists of the reputation that he has acquired with his customers.[16] If he is allowed to resume busi-

[14] Injunctions were granted in nearly all of the cases listed in footnote 10.

[15] 5 Williston on Contracts (Rev. Ed. 1937) § 1640.

[16] 5 Williston on Contracts (Rev. Ed. 1937) § 1640. A century or more ago Lord Eldon said that good-will "is nothing more than the probability that the old customers will resort to the old place." *Cantwell v. Lye*, 17 Ves. 335 (1810). But the modern decisions recognize that the old customers tend to resort to the old trade-mark or trade-name and to the old individual as well as to the old place and that these tendencies are parts of the seller's goodwill. It is true that the purchaser of a business cannot take advantage of the tendency to resort to the old person, since he is a different person, but the seller can put an end to that tendency by going out of business. If he does so that good-will which results to the buyer

ness operations in the neighborhood most of those customers will soon discover his new location; if they like his wares or his business methods (and unless some of them do he has no good-will to sell) many of them will continue to trade with him instead of transferring their patronage to the buyer of the business. It can, therefore, be argued convincingly that any selling to former customers is inconsistent with the seller's agreement to transfer his good-will to the purchaser. It would be impracticable, however, to permit the seller to do business and at the same time forbid him to serve such of his old customers as may come to him. The only effective way in which to give the buyer an adequate opportunity to obtain the good-will which he has bought is to treat the seller as having impliedly agreed not to compete at all.

The Massachusetts court has adopted substantially this view. It holds that a sale of a business implies a promise by the buyer not to compete in such a way as will deprive the buyer of the benefit of the good-will purchased.[17] Although it is said to be a question of fact in each case whether competition will have such an effect, it is in practice usually found that it will have such an effect and that competition is therefore improper.[18]

The arguments for adopting this view are peculiarly strong in the case of the sale of a medical practice. Here it is abundantly clear that good-will does not mean primarily "the probability that the old customers will resort to the old place," [19] but the probability that they will continue to seek the services of the old man. Whatever may be true of a grocer, a doctor or dentist will lose few customers by moving, provided his new address is known and is reasonably convenient.

Some courts which do not accept the Massachusetts view with respect to the sale of a commercial business have held that the sale of a medical or other professional practice is distinguishable and that the latter does imply an agreement not to compete [20]; in fact, there is very little direct authority against this view.[21] The Massachusetts court has held that its rule that competition is always improper if it would deprive the buyer of the good-will necessarily makes all competition in the same locality by the seller of a medical practice unlawful, since in the case of a medical or dental practice

from the customers' tendency to resort to the old place of business or to the old name of the business will not be counteracted by the customers' tendency to continue to deal with the same man.

[17] *Angier v. Wakefield,* 11 Allen 211 (Mass. 1867); *Old Corner Bookstore v. Upham,* 194 Mass. 101, 80 S.E. 228 (1907); *Martino v. Pontone,* 270 Mass. 158, 170 N.E. 67 (1930).

[18] For cases in which continued competition by the seller was held not to be inconsistent with his sale of his good-will see *Hoxie v. Chaney,* 143 Mass. 592 (1887); *Fairfield v. Lowry,* 207 Mass. 352, N.E. (1911).

[19] Lord Eldon, C in *Cantwell v. Lye,* 17 Ves. 335 (1810).

[20] *Brown v. Benzinger,* 118 Md. 29, 84 Atl. 79 (1912) (chiropodist); *Yeakley v. Gaston,* 450 Tex. Civ. App. 405, 111 S.W. 768 (1908) (physician). See also *Townsend v. Hurst,* 37 Miss. 679 (1859) (physician).

[21] In *Dillon v. Nicodeme,* 117 S.W. (2d) 668 (Tex. Civ. App. 1938), a chiropractor, who had bought the defendant's practice and good-will, was denied an injunction against the defendant, who had resumed practice in the same building. The court said that competition, without solicitation of former patients, did not violate the contract and that, furthermore, the plaintiff was not licensed to practice and could not legally do so. The court seems to have been unaware of its earlier remarks in *Yeakley v. Caston,* 50 Tex. Civ. App. 405, 111 S.W. 768 (1908), supra note 20.

"the personal qualities of integrity, professional skill and ability attach to and follow the person not the place." [22] In Massachusetts the only difference in most cases between an express agreement by a seller not to compete and the agreement which is implied from his sale of the business is that in the first case the geographical limits which are expressly stated in the agreement will be approved by the court unless they are clearly broader than the area of the practice sold whereas in the latter case an implied limitation somewhat narrower than the area of the seller's practice may be deemed to give sufficient protection to the buyer. In *Foss v. Roby*,[23] a retiring partner in a firm of Boston dentists sold his share of the good-will to his copartner and three years later resumed the practice of dentistry in that city. The court enjoined him from continuing to practice in Boston but limited the injunction to the city limits despite the fact that a considerable portion of the former partnership's business came from patrons living in other Massachusetts cities and towns. Presumably an express agreement not to compete would have been enforced as written even if the agreement had covered a considerably wider area than Boston.

Contracts by a Physician or Dentist Who Is Employed by Another Not to Compete with the Latter After the Termination of the Employment. There is a wide variation among courts with respect to their general attitude towards contracts by an employee not to compete with his employer after the termination of the employment. The English courts declare that such contracts are quite different from contracts between the buyer and the seller of a business, and that in the former case an agreement not to compete is unreasonable and invalid in the absence of special circumstances making such a contract reasonably necessary for the protection of the employer.[24] A number of recent American decisions have taken a view substantially similar to that of the English courts [25]; but many American courts make little distinction between contracts between buyer and seller and contracts between employer and employee.[26]

There can be little question that the English view that the employer-employee situation differs radically from that of buyer and seller is sound.[27]

[22] *Foss v. Roby*, 195 Mass. 292, 297, 81 N.E. 199 (1907).

[23] 195 Mass. 292, 81 N.E. 199 (1907).

[24] *Herbert Morris, Ltd. v. Saxelby* [1916] A.C. 688.

[25] *Clark Paper & Mfg. Co. v. Stenacher*, 236 N.Y. 312, 140 N.E. 704 (1923); *Club Aluminum Co. v. Young*, 263 Mass. 223, 160 N.E. 804 (1928) (but cf. *Becker College of Business Administration & Secretarial Science v. Gross*, 281 Mass. 355, N.E. (1933); *Samuel Stores v. Abrams*, 94 Conn. 248, 108 Atl. 54 (1919) (but cf. *Torrington Creamery Co. v. Davenport*, 126 Conn. 515, Atl. (1940).

[26] See the numerous cases cited in 5 Williston on Contracts, § 1643 sustaining such contracts when made by employees.

[27] But cf. 5 Williston on Contracts (Rev. Ed. 1937) § 1643. "The ultimate question should be the same in both cases,—what is necessary for the protection of the promisee's rights and is not injurious to the public." To state the "ultimate question" that way is to treat the inequality of bargaining power between employer and employee and the hardship which such contracts impose on employees as legally irrelevant considerations. It is true that our nineteenth century common law of contracts tended in general to ignore such factors, and that twentieth century limitations on the legal power of employers to exact unfair agreements from their employees have come about mainly through legislation. But in this particular subject—contracts in restraint of trade—the older common law tradition recognized the

Contracts to refrain from competition are contracts in restraint of trade. They are, therefore, invalid unless they are reasonable. The question of reasonableness involves a consideration of the interests of each of the parties to the contract and also of the public interest. There is first of all the promisee's interest. The purchaser of the good-will of a business always has an interest in preventing competition by the seller which tends to deprive him of the good-will which he has bought. The employer, on the other hand, is not buying good-will but services. Unless his employee has learned his trade secrets or become familiar with his customers, the employer has no greater interest in protection against the competition of his former employee than he has in protection against the competition of any other equally competent person—and the latter protection is something that the law refuses to give him even if he has bargained for it.[28]

Moreover, the employee's interests also must be considered. A contract that he will not engage in competition with his former employer, either on his own account or as the employee of some one else, means that he must either change his line of work or his place of residence, even becoming an exile if his employer's business covers the whole country. He is likely to make such a contract at an early stage in his career, when most of his business or professional life lies before him. Such an agreement, if valid, will, as Lord Shaw of Dunfermline has said, be "subversive of the way of life to which [his] past special training has led up." [29] Moreover, there will in many, perhaps in most cases, be such inequality of bargaining power between employer and employee that the latter will get little or no compensation, other than temporary employment at current rates of pay, for agreeing to a restriction which affects his entire future business career. The situation is very different where the agreement is part of a bargain by which one who desires to retire from business agrees, for compensation, not to change his intention.

The injury to the public also is likely to be more serious in the employee case than in the sale case. In the former the public, or at least the local public, loses the services of one who is likely to be still young and vigorous, of one who has no desire to retire from active life. In the latter the public loses only the services of one who has already evinced an intention of retiring, though it is true that the legal validity of the agreement will not become important unless that intention changes.

The distinction between the English view and that taken by many American courts is, however, of little importance in the fields of medicine and dentistry. Doctors and dentists do not make restrictive agreements with

danger that "masters" would "give their apprentices much vexation" if the latters' agreements not to compete were held valid, and in general condemned such agreements. See *Mitchel v. Reynolds,* 1 P. Wms. 181 (1711). The English courts have wisely adhered to the older view.

[28] Agreements not to compete made by one who is neither the seller of a business nor an employee or partner are ordinarily invalid as being in restraint of trade.

[29] See *Herbert Morris, Ltd. v. Saxelby* [1916] A.C. 688, 715.

their bookkeepers or office boys, but with their medical or dental assistants. Such assistants do come in contact with their patients. Frequently, they become better liked by some patients than the persons who employ them. Their competition after the termination of the employment would, therefore, be competition which would take advantage of relationships with patients established during the employment and by means of the employment. Such competition will apparently be enjoined even in England.[30]

Clearly, however, there are arguments on the other side. A man's customers do not belong to him as his trade secrets do.[31] To oblige him to compete with his former employee may be annoying to him, but it involves little real hardship. To deny the former employee the right to continue to practice his profession without moving to a new community is exceedingly harsh. To deprive those patients who prefer the former employee's professional services to those of any one else of services which he is eager to give them is a hardship on them as well as on him. Contracts of the sort we are discussing, made by physicians or dentists—professions whose function like that of all true professions, is maximizing community service rather than maximizing profits—are not contracts in which public-spirited members of those professions can take pride. Yet such contracts, which must be fairly common since they have produced a considerable amount of litigation, are almost without exception upheld by American courts unless found to be of unduly broad scope.[32]

[30] There are no recent English cases dealing with restrictive contracts between doctors, dentists or other professional men and their employers, but the language in the leading case of *Herbert Morris, Ltd. v. Saxelby* [1916] A.C. 688 indicates that such contracts, reasonably limited as to space, would ordinarily be held valid. The earlier cases so held. *Davis v. Mason,* 5 Term. Rep. 118 (1793) (contract by assistant surgeon not to practice within 10 miles of his former employer's residence for 14 years held valid); *Mallon v. May,* 11 M. & W. 653 (1843) (contract by dentist's assistant not to practice in London or certain other towns held valid as to London); *Dendy v. Henderson,* 11 Exch. 194 (1855) (contract by solicitor's clerk not to act as such in the vicinity for 21 years held valid); *Lewis & Lewis v. Dunford,* 24 T. L. R. 64 (Ch. D. 1907) (contract by a solicitor's clerk not to "act for any person who is or has within the previous 5 years been a client of the firm" held valid).

[31] No doubt an employer's list of customers is his property but the question is whether the employee can serve his former employer's customers, not whether he can legally copy his employer's list of customers.

[32] The cases upholding such contracts are numerous and the following list is not exhaustive. In most of them the contract was held not only valid at law but enforcible in equity by injunction.

(a) Contracts by a physician or other medical practitioner with an assistant by which the latter agrees not to practice for a certain time after the termination of the employment.

Styles v. Lyon, 87 Conn. 23, 86 Atl. 564 (1913) (unlimited contract by doctor's assistant not to practice in same town; injunction held properly limited to time during which former employer should continue to practice); *Freudenthal v. Espey,* 45 Colo. 488, 102 Pac. 280 (1909) (contract by doctor's assistant not to practice in same city for 5 years); *Granger v. Craven,* 159 Minn. 296, 199 N.W. 10 (1924) (contract by doctor's assistant not to practice within 20 miles of Rochester for 3 years); *Foster v. White,* 248 N.Y. App. Div. 451, 290 N.Y. Supp. (2d) 394 (1936) (unlimited contract by doctor's assistant not to practice in county). But see the same case on a subsequent appeal, *Foster v. White,* 253 N.Y. App. Div. 448, 3 N.Y. Supp. (2d) 456 (1938). It appeared that the plaintiff had improperly terminated the defendant's employment and he was accordingly denied an injunction against the defendant's practicing); *Wilson v. Gamble,* 177 Miss., 363, 177 So. 363 (1937) (contract by two doctor's assistants not to practice within 5 mile radius for 5 years); *McMurray v. Faust,* 224 Ia. 50, 276 N.W. 95 (1937) (contract by doctor's assistant not to practice in

Moreover, such contracts, like other contracts not to compete, are usually treated as entitling the promisee to an injunction and not merely to damages. That view has not been universally adopted, however. A few courts have recognized the harshness of such contracts to the extent of saying that a court of equity will not grant an injunction against the breach of such an agreement by the doctor's or dentist's assistant unless the court is convinced that competition by the latter would impose severe hardship on his former employer.[33]

Contracts by Partners Not to Compete. Both in business and in the medical and dental professions agreements not to compete are frequently made between partners. In some cases the agreement is made at the time when some partner retires from the firm, in which case the agreement is, in effect, an agreement for the sale of his part of the firm's good-will to his co-partners.[34] In other cases such agreements are made when a partnership is formed or when a junior partner, often one who has previously been an employee, is admitted to the firm, in which case the partner's contract not to compete closely resembles an employee's contract not to compete after the termination of his employment. Similar agreements are sometimes made by physicians who are associated in some way, but are not partners or at any rate do not regard themselves as such. Agreements of these various types, when made by physicians or dentists, are almost without exception held valid and enforced by means of an injunction.[35]

county for 5 years); *Larsen v. Burroughs*, 224 Ia. 740, 277 N.W. 403 (1938) (contract by doctor's assistant not to practice in same town for 10 years).

(b) Similar contracts by dentists.

Tillinghast v. Boothby, 20 R.I. 59, 37 Atl. 344 (1897) (contract by dentist's assistant not to practice in county); *Turner v. Abbott*, 116 Tenn. 718, 94 S.W. 64 (1906) (unlimited contract by dentist's assistant not to practice in vicinity); *Erickson v. Hawley*, 12 F. (2d) 491 (D.C. Ct. App. 1926) (contract by orthodontist's assistant not to practice in District of Columbia for 10 years).

In *Olsen v. Swendiman*, 62 N.D. 649, 244 N.W. 870 (1932) a contract by a dentist's assistant not to practice in the same or a neighboring city for two years was held invalid because in violation of a North Dakota statute.

In *Farr v. Stearman*, 264 Ill. 110, 105 N.E. 957 (1914) a contract by a dentist with his employer, who was not a dentist, that the former would not practice within a 25-mile radius was construed to deny him the right to practice even if he carried out the terms of an agreement which entitled him to buy the business. It was held unreasonable and invalid.

[33] In *Osius v. Hinchman*, 150 Mich. 603, 114 N.W. 402 (1908) the court recognized the validity of a contract by a dentist's assistant not to practice in Muskegon for five years, but refused to enforce it by an injunction. Cf. *Schneller v. Hayes*, 176 Wash., 115, 28 Pac. (2d) 273 (1934) in which an optician's employee had agreed never to do business as an optician in the city. His employment was an employment at will and the court said that the agreement was too one-sided to be enforced in equity.

[34] The following cases involve contracts of this type: *Latham v. Butler*, 17 S.W. (2d) 1083 (Tex. Civ. App. 1929). Two physicians had been co-owners of a hospital and had operated it as partners. Defendant sold out to plaintiff who agreed to pay all the partnership debts and to employ defendant for one year, defendant agreeing not to practice in the county thereafter. The agreement was enforced by injunction. *Sover v. Buck*, 351 Ill. 643, 184 N.E. 860 (1933). A retiring member of a medical partnership agreed for consideration not to practice in the same city. The agreement was held valid.

[35] The following cases involve contracts of these types: *Glover v. Shirley*, 169 Mo. App. 637, 155 S.W. 878 (1913) (agreement made by a junior partner on being admitted to a firm that he would not after leaving it practice within a 10-mile radius for 10 years, enforced by injunction); *Marvel v. Jonah*, 83 N.J.Eq. 295, Atl. (Ct. Err. & App. 1914) (agreement

SUMMARY

Judicial hostility to agreements in restraint of trade would undoubtedly make a promise by a doctor or dentist not to practice his profession invalid, where such promise was unconnected with the sale of a practice, or with an employment, a partnership or some similar type of association. Where, however, as is usually the case, the person to whom such promise is made is a purchaser of a practice or an employer or partner of the promisee, the agreement is almost universally found to be reasonable and lawful. Whether it is desirable to treat such agreements not to practice one's skill in the art of healing as valid and binding is a question of social policy, on which neither a judge nor a law teacher is ex officio an expert.

by a junior partner that, if the partnership were ever dissolved by reason of his violation of the partnership agreement, he would not practice in the city for three years, enforced by injunction); *Proctor v. Hansel,* 205 Ia. 542, 218 N.W. 255 (1928) (promise by young osteopath, as part of an agreement by which he was associated with an older man, that after the termination of the arrangement he would not practice osteopathy in the city for three years, enforced by injunction); *Shaleen v. Strattle,* 188 Minn. 219, 246 N.W. 744 (1933) (provision of partnership agreement that on the termination of the partnership one partner would not practice medicine in either of two counties for five years, enforced by injunction); *Herrington v. Hackler,* 181 Okla. 396, 74 Pac. (2d) 388 (1937) (provision in partnership agreement between two doctors who owned a hospital that if the partnership proved unsatisfactory, defendant would either buy out the plaintiff or turn the hospital over to him and refrain from practicing for five years within a radius of 100 miles; stipulation against practicing enforced by injunction).

But cf. *Rakestraw v. Lanier,* 104 Ga. 188, 30 S.E. 175 (1898) in which a provision in a partnership agreement that at its expiration one of the partners would not practice medicine within a 15-mile radius was held invalid because unlimited as to time.

TORT LIABILITY OF HOSPITALS *

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MANY are the situations in which the activities of a hospital may cause damage to someone, who thereupon brings an action for tort against the hospital. An action for tort is a civil proceeding brought by the complaining person to recover damages from the person or corporation charged with causing the injury. The injury may be to the person of the plaintiff or to his property. We are not concerned with the liability of the individual who caused the injury but only with that of the hospital itself. We are not concerned with liability for breach of contracts made by the hospital. We are not concerned with questions of criminal liability. We are concerned only with the question of the liability of hospitals to pay damages for injury to person or property.

The cases in which actions have been brought against hospitals, which are scattered through the volumes of the state and federal reports, would fill several volumes. These reports as a rule contain only cases which have been carried to the higher courts, and there are, of course, numerous cases which have not been appealed to the higher courts. They show the kinds of claims which may be made against hospitals. They involve claims that a physician or surgeon was negligent in the treatment of a patient; that an operation was performed without the consent of the patient; that a nurse left sponges in a patient's body, or burned an unconscious patient with a hot water bottle, or gave a patient the wrong medicine; that an ambulance driver negligently ran over a pedestrian; that a roentgen-ray technician negligently burned a patient; that incompetent nurses were employed; that the floors were slippery or the stairs unlighted; that a newborn baby was given a bed instead of a bassinet; that insane patients were permitted to leap from windows; that insane patients were maltreated by attendants; that patients having contagious diseases were not properly segregated; that a fire resulted from defective wiring; that patients were neglected; that an elevator was defective; that unwholesome food was served; that driveways were unlighted or sidewalks defective; that the property of patients was negligently lost; that the hospital was so conducted as to disturb persons living nearby. In all of these cases someone was negligent or guilty of willful misconduct and someone else was injured. In all of these cases the question arose whether the hospital corporation was subject to liability.

An individual is liable to a person who suffers damage as a result of his negligence. So also, he is liable for damage caused by the negligence of an employee acting within the scope of his employment. This general principle of tort liability is applicable to corporations. A corporation is liable for

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damage caused by the negligence of its officers or directors or employees acting within the scope of their employment. The question which we have to consider is whether and to what extent a hospital is exempt from such liability.

To the extent to which a hospital is entitled to exemption from tort liability it is on the ground that it is a charitable corporation. The question of the exemption of hospitals is a phase of the broader question of the exemption of charitable institutions. A similar question arises as to the exemption of educational institutions, religious organizations, homes for orphans or for the aged, and institutions of other sorts for the benefit of the community, such as Young Men's Christian Associations. The purposes for which these institutions are created and maintained are charitable purposes. Undoubtedly, also, the promotion of health is a charitable purpose, whether the purpose is the prevention or cure or treatment of diseases or other human ills of the flesh.

A distinction must be made, however, between proprietary and charitable institutions. Just as a school which is conducted for private profit is not a charitable institution, although it promotes education, so also a hospital or nursing home conducted for profit is not a charitable institution, although it promotes health. Just as such proprietary institutions are not exempt from taxation, so they are not exempt from tort liability. It is a proprietary institution where the profits, if any, are to be devoted to private uses, as where they go into the pockets of those who own the institution. The mere fact, however, that in the conduct of the institution profits are earned does not make the institution a proprietary one, if the profits must be used in furthering the charitable work of the institution. The fact that the recipients of benefits are compelled to pay for the services they receive if they are financially able to pay does not prevent the institution from being a charitable institution; and this is true, although there is some conflict in the decisions of the courts, even though no services are rendered gratuitously. Thus, a hospital which is not privately owned is none the less charitable although most, if not all, of its patients are paying patients.

What is the basis for the claim of exemption from tort liability of charitable institutions, including hospitals? Three possible bases have been suggested by various courts in their decisions.

(1) The first suggested basis is that where property is devoted to charitable objects it should not be diverted from those objects, and that to compel the corporation to use its property in paying claims of persons who have been injured is such a diversion. This is sometimes called the "trust-fund theory." Thus, in a case in Massachusetts,[1] the court stated as a reason for exempting a hospital from tort liability that "being a charitable institution rendering services to the public without pecuniary profit, if the property of the charity was depleted by the payment of damages its usefulness might be

[1] *Farrigan v. Pevear*, 193 Mass. 147, 149, 78 N.E. 855 (1906).

either impaired or wholly destroyed, the object of the founder or donors defeated, and charitable gifts discouraged."

Under this theory the exemption of the hospital is very broad. Under it the hospital is not subject to liability whether the negligence is that of the directors or trustees or officers or that of its nurses or other employees; it is not subject to liability whether the person injured is a patient, either a paying patient or a charity patient, or is a visitor or employee or a stranger, as for example a person who is injured on the sidewalk in front of the hospital or a person who is struck by an ambulance.

(2) Another suggested basis is that of waiver or implied agreement. The theory is that a person who receives the services of a hospital impliedly agrees to waive the right to hold the hospital liable for any injuries he may receive at the hospital. In the Massachusetts decision just cited the court stated as a ground for exemption that "if an individual accepts the benefit of a public charity he thereby enters into a relation which exempts his benefactor from liability for the negligence of servants who are employed in its administration, provided due care has been used in their selection."

Such a waiver, it seems clear, is purely fictitious. It certainly is inapplicable to injured persons other than patients. It does not apply to strangers, such as pedestrians, who are injured by the negligent driving of an ambulance; it does not apply to injured employees of the hospital; it does not apply to visitors who are injured on the hospital premises, as, for example, those who fall on an improperly lighted stairway or on a slippery floor. It applies to charity patients. It is generally held to apply also to paying patients, although there seems to be little basis for the notion that a patient who pays for the service rendered by the hospital agrees to waive any claim against the hospital. The courts, however, have generally felt that it would be an invidious distinction if they were to hold that damages could be recovered by a paying patient, but none could be recovered by a charity patient. Moreover, even the paying patient seldom pays the full cost of the service rendered.

(3) A third suggested basis of exemption is that the doctrine under which an employer is liable for the negligence of his employee, the so-called doctrine of *respondeat superior,* is not applicable to charitable institutions. The suggestion is that this doctrine should be limited to undertakings carried on for the profit of the employer, business and not charitable undertakings. Under this theory there can be no recovery against the hospital by anyone, whether patient or visitor or employee or stranger, where the injury results from the negligence of a mere employee of the hospital, whether janitor, ambulance driver, orderly, nurse or physician or surgeon. Thus, in a case in Connecticut,[2] where an action was brought against a hospital for injury caused by the negligence of an employee of the hospital, the court said: "The law which makes one responsible for an act not his own, because the actual

[2] *Hearns v. Waterbury Hospital,* 66 Conn. 98, 123, 125, 33 Atl. 595, 603, 604 (1895).

wrongdoer is his servant, is based on a rule of public policy. The liability of a charitable corporation for the defaults of its servants must depend upon the reasons of that rule of policy, and their application to such a corporation. . . . This defendant does not come within the main reason for the rule of public policy which supports the doctrine of *respondeat superior;* it derives no benefit from what its servant does, in the sense of that personal and private gain which was the real reason for the rule."

On the other hand, under this theory the hospital is not exempt from liability for the negligence of the governing board or of the administrative officers of the hospital. Thus, the hospital is liable where the injuries result from the negligent selection or retention of incompetent employees, from the failure to make proper rules for the conduct of the institution, or from negligence in permitting the premises to be in a dangerous condition. A distinction is drawn under this theory between the negligence of those higher up and the negligence of a mere employee.

None of the suggested reasons for exemption is altogether satisfactory and in most of the states no one theory is consistently applied. The rules in the various states as to the exemption of hospitals from tort liability vary greatly. At one extreme are states like Massachusetts which go the full length in giving exemption, no matter who is injured and no matter who among the officers or employees of the hospital by his negligence caused the injury. At the other extreme are jurisdictions like the District of Columbia where the Court of Appeals has held that an institution is entitled to no exemption from liability in tort merely because it is a charitable institution. In other states the courts have taken some intermediate view, some of them holding that a hospital is exempt from liability to its patients, but is not exempt from liability to other persons, such as employees, visitors or strangers, others holding that a hospital is not liable for the negligence of mere employees but is liable for the negligence of its governing board or officers. A review of the more recent decisions shows a trend toward the limiting or the abolition of the exemption of hospitals and other charitable institutions.

The rule in the District of Columbia was laid down for the first time in a recent case in which a hospital was held liable to the plaintiff, a special nurse, who was injured when a student nurse violently pushed a swinging door which struck the plaintiff. Judge Rutledge, after a careful examination of the decisions in the various states with their "welter of conflict," and after examining and rejecting the various bases on which exemption has been granted, held that the fact that the defendant is a charity gives it no immunity. He said, "The rule of immunity is out of step with the general trend of legislative and judicial policy in distributing losses incurred by individuals through the operation of an enterprise among all who benefit by it rather than in leaving them wholly to be borne by those who sustain them. The rule of immunity itself has given way gradually but steadily through widening, though not too well or consistently reasoned, modifications. It is

disintegrating. Each modification has the justification that it is a step in result, if not in reason, from the original error toward eventual correction. As more and more steps are taken, correction becomes more complete. The process is nearing the end." He said that insurance should be carried to guard against liabilities and concluded: "To offset the expense [of insurance] will be the gains of eliminating another area of what has been called 'protected negligence' and the anomaly that the institutional doer of good asks exemption from responsibility for its wrong, though all others must pay. The incorporated charity should respond as do private individuals, business corporations and others, when it does good in the wrong way." [3]

No matter what view may be taken as to the liability of a hospital for the negligence of persons employed by it, the hospital is under no liability to persons injured through the negligence of one who was not in the employment of the hospital. In such a case the hospital is under no liability, not because of an exemption given to charitable institutions but because the general doctrine of *respondeat superior,* the doctrine that an employer is responsible for his employee's acts, is not applicable to the particular situation. There are numerous cases holding that the hospital is not liable because the negligence was that of a physician or surgeon or nurse who was employed by the patient and not by the hospital. In a leading New York case,[4] a woman sued a hospital alleging that the house physician discovered a lump which proved to be a fibroid tumor, and that he consulted the visiting physician who advised an operation, and that she consented to an examination but not to an operation, and that while she was under ether the operation was performed and that gangrene developed. This testimony was disputed, but the court held that even if it were true the hospital was not liable. Judge Cardozo said:

[3] *President and Directors of Georgetown College v. Hughes,* 130 F. (2d) 810, 827, 828 (App. D.C. 1942).

In this case Judge Rutledge drew the following conclusions as to the state of the law in the various states, recognizing, however, that it is difficult in some of the states to determine the precise rule there prevailing.

Full immunity, except perhaps for administrative negligence or in special cases: Arkansas, Illinois, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Oregon, Pennsylvania, South Carolina, Wisconsin.

Full liability: District of Columbia, Minnesota, New Hampshire, New York, and probably Oklahoma. Also England, Canada and New Zealand.

Recovery by strangers and paying patients but possibly not charity patients: Alabama, California, Florida, Georgia, Idaho, Oklahoma, Utah.

Recovery by strangers but not patients: Connecticut, Indiana, Iowa, Louisiana, Michigan, Nebraska, New Jersey, North Carolina, Ohio, Rhode Island, Texas, Virginia, Washington.

No recovery by patients but no decisions as to strangers: Arizona, Maine, Mississippi, Montana, Nevada, West Virginia, Wyoming.

Liability if protected by insurance: Colorado, Tennessee.

No decisions: Delaware, New Mexico, North Dakota, South Dakota, Vermont.

For a collection of cases on the liability of hospitals, see 49 A.L.R. 379 (1927).

As to the liability of charitable corporations in general, see 14 A.L.R., 572 (1921), 23 A.L.R 923 (1923), 30 A.L.R. 455 (1924), 33 A.L.R 1369 (1924), 42 A.L.R. 971 (1926), 62 A.L.R. 724 (1928), 86 A.L.R. 491 (1933), 109 A.L.R. 1199 (1937), 124 A.L.R. 814 (1940), 133 A.L.R. 821 (1941). See Scott, Trusts (1939, Supp. 1942) § 402.

[4] *Schloendorff v. New York Hospital,* 211 N.Y. 125, 131, 132, 105 N.E. 92, 94 (1914).

"The wrong was not that of the hospital; it was that of physicians, who were not the defendant's servants, but were pursuing an independent calling, a profession sanctioned by a solemn oath, and safeguarded by stringent penalties. If, in serving their patient, they violated her commands, the responsibility is not the defendant's; it is theirs. There is no distinction in that respect between the visiting and the resident physicians. Whether the hospital undertakes to procure a physician from afar, or to have one on the spot, its liability remains the same. . . .

"It is true, I think, of nurses as of physicians, that in treating a patient they are not acting as the servants of the hospital. The superintendent is a servant of the hospital; the assistant superintendents, the orderlies, and the other members of the administrative staff are servants of the hospital. But nurses are employed to carry out the orders of the physicians, to whose authority they are subject. The hospital undertakes to procure for the patient the services of a nurse. It does not undertake through the agency of nurses to render those services itself."

It is to be noted that the hospital is not liable for the negligence of a nurse where the nurse is not an employee of the hospital but is employed by the patient; and even if the nurse is an employee of the hospital, it is not liable for her negligence when she is acting under the direct authority of a physician or surgeon.

In a recent New York case,[5] where a patient gave his dentures to a special nurse engaged for him by the hospital, it was held that the nurse was not an employee of the hospital, and if the teeth were lost as a result of the negligence of the nurse, the hospital was not liable.

On the other hand, even if a person, as for example a roentgen-ray technician, is not an employee of the hospital, the hospital may be liable for injury if it has represented that he is its employee.[6]

The question has occasionally arisen whether a hospital or other charitable institution is subject to liability where it has taken out insurance against liability, although it would otherwise be exempt. It has been held in a number of cases that it is immaterial that the hospital is insured.[7] This is on the ground that the insurance is only against legal liability and there is no legal liability, with the result that the insurance company receives the premiums but runs no risk. The result is, it would seem, unfair to the hospital which pays the premiums and unfair to the person who is injured. It would seem more equitable to interpret the insurance policy as an agreement to save the hospital harmless not only from claims that would otherwise be legally enforceable but from any claims which could be enforced against it if it were not a charitable institution. There is recent authority to the effect that where the

[5] *Fisher v. Sydenham Hospital, Inc.*, 176 Misc. 7, 26 N.Y.S. (2d) 389 (1941).
[6] *Stanhope v. Los Angeles College of Chiropractic*, 128 P. (2d) 705 (Cal. App. 1942).
[7] See *Levy v. Superior Court*, 74 Cal. App. 171, 239 Pac. 1100 (1925); *Williams' Adm'x v. Church Home*, 223 Ky. 355, 3 S.W. (2d) 753 (1928); *Enman v. Trustees of Boston University*, 270 Mass. 299, 170 N.E. 43 (1930); *Mississippi Baptist Hospital v. Moore*, 156 Miss. 676, 126 So. 465 (1930); *Herndon v. Massey*, 217 N.C. 610, 8 S.E. (2d) 914 (1940).

hospital has liability insurance, the injured person can recover damages from the hospital not exceeding the amount of the insurance, even though in the absence of such insurance the hospital would be exempt.[8]

Whatever rule is applied to privately endowed hospitals, it is generally held that a hospital maintained by a state or a political subdivision of the state, such as a county or municipality, is exempt from liability, as is the state or county or municipality.[9]

In states in which hospitals are exempt from liability in tort, the exemption is applicable not only in the case of personal injuries but also in the case of property damage. Thus, in a case in Ohio,[10] it was held that a patient could not recover for the loss of jewels entrusted to the hospital for safekeeping and lost through the negligence of the custodian in handing them over to an imposter.

In states in which hospitals are exempt from liability in tort, a patient who has suffered injuries as a result of the negligence of an employee of the hospital cannot recover damages against the hospital on the theory that it has made a contract for careful treatment.[11]

Even in states in which a hospital has immunity from liability for tort committed in its administration, it can be enjoined from maintaining a nuisance. Thus, in a case in Pennsylvania[12] the complainants were the owners of a house adjoining a hospital which maintained an operating room the windows of which faced the house at a distance of from 9 to 12 feet, with the result that the moans, shrieks and groans of persons receiving surgical aid "were of such a character as to render wretched the lives of complainants, and of friends visiting them, and were such as to affect their nerves and impair their health." It further appeared that persons occupying rooms in the hospital were permitted to throw refuse across the fence and upon complainants' property. The court awarded an injunction, ordering the removal of the operating room to some other part of the building and restrained the defendant from permitting persons occupying rooms in the hospital to throw refuse matter upon complainants' property. There are other cases also in which hospitals were so conducted as to constitute a nuisance and in which the court ordered the abatement of the nuisance.[13]

[8] *O'Connor v. Boulder Colorado Sanitarium Ass'n*, 105 Colo. 259, 96 P. (2d) 835 (1939); *Vanderbilt University v. Henderson*, 23 Tenn. App. 135, 127 S.W. (2d) 284 (1938). See *Lusk v. United States Fidelity & Guaranty Co.*, 199 So. 666 (La. 1941).

[9] *President and Trustees of the University of Louisville v. Metcalfe*, 216 Ky. 339, 287 S.W. 945 (1926). See a note in 49 A.L.R. 379 (1927) on liability of hospital maintained at expense of state or a political subdivision for torts of its officers or employees.

[10] *Rudy v. Lakeside Hospital*, 115 Ohio St. 539, 155 N.E. 126 (1926).

[11] *Wattman v. St. Luke's Hospital Ass'n*, 314 Ill. App. 244, 41 N.E. (2d) 314 (1942); *Roosen v. Peter Bent Brigham Hospital*, 235 Mass. 66, 126 N.E. 392 (1920).

[12] *Kestner v. Homeopathic Medical and Surgical Hospital*, 245 Pa. 326, 91 Atl. 659 (1914).

[13] *Deaconess Home and Hospital v. Bontjes*, 207 Ill. 553, 69 N.E. 748 (1904); *Herr v. Central Kentucky Lunatic Asylum*, 97 Ky. 458, 30 S.W. 971 (1895), 110 Ky. 282, 61 S.W. 283 (1901).

COMPULSORY VACCINATION AND STERILIZATION: CONSTITUTIONAL ASPECTS *

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ANY statute or administrative order authorizing or compelling involuntary medical or surgical treatment has the possibility of being scrutinized and countermanded by the Supreme Court of the United States. Where the deed is done before the Supreme Court can forbid it, there still may be suits against the perpetrators for damages, and the Supreme Court can decide whether the statute relied on for justification is one entitled to constitutional sanction. In deciding such issues the Supreme Court has no other primary guide than the provision of the Fourteenth Amendment to the Federal Constitution that "No State shall . . . deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws." As a guide to judgment, this is no guide at all. Nevertheless the Supreme Court has for years, in the name of these provisions, condemned legislation that a majority of its members deemed to be sufficiently arbitrary and unreasonable. The exercise of this power has not been confined to the procedures by which governmental action is taken, but has extended to the substance of the commands and prohibitions.

Few, if any, are likely to contend that this power has invariably been wisely exercised. On several issues the average of the Supreme Court is zero. The Court has held that an employer may not be forbidden to exact as a condition of employment that the employee will not become or remain a member of a labor union. The Court has held the contrary. It has similarly reversed itself on the issue of a 10 hour limitation of labor in factories and on the issue of legislative prescription of a minimum wage for women in industry. In thus referring to "the Court" as though it were a continuing body, a caution would be necessary if it were not so obvious. Although through the somersault of Mr. Justice Roberts, the same bench both condemned and sustained a minimum wage law, usually any decided shift in decision comes after a shift in the composition of the tribunal. This could not be denied as a matter of fact. Yet what to a plain man would seem a necessary inference from the fact, is not so universally acknowledged.

The law books have been full of foolish statements from judges which would make them out to be mere automatons in applying meaningless constitutional phrases to determine the validity of statutes. From dissenting judges, however, often comes the charge that the majority have unjustifiably transformed their own views of public policy into constitutional commands or prohibitions. Most amusingly a distinguished lawyer and former judge

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in protesting against the President's so-called "court packing plan" asserted the theory of judicial automatism, apparently unaware that if it made no difference who was on the bench, it made no difference who was on the bench. We know well enough from recent history that it does make a difference. We have seen too many new judicial attitudes substituted for former ones. Not a few of them have been direct and confessed recantations. Others have been decisions which clearly would not have been reached by an earlier bench but which found no direct precedents in their way. Still others have been decisions accompanied by opinions which made such sleazy distinctions between the case at bar and its predecessors that it was apparent to persons with a modicum of discernment that the current had changed its course.

From this propensity of judges to pretend that they are consistent with the past when it is obvious that they are not, arises a major difficulty in prophesying what they will do next. The old precedents hang on, not overruled. A later court may follow them and rely on the unjustifiable distinction drawn in the interim. Or the unjustifiable distinction may be repeated a number of times and later be officially recognized as a contradiction rather than a distinction and hence an inflicter of a mortal wound on the law that lived before. Such are the perils to prophecy when it is pretty obvious that the judicial distinctions are skating on very thin ice. When it is not obvious, the lot of the would-be prophet is certainly no happier. There are too many cases where clearly tenable distinctions have been made the sensible basis of judgment and yet have later turned out to be forerunners of an erosion or an abandonment of what had been well established earlier. An expert can report what a court has said and done and can weave it all into an apparently neat and harmonious pattern. It still remains true that it is often a gamble to try to forecast what the court will say and do next.

Akin to the difficulties of prophecy when there are a number of decisions and opinions to be taken into consideration is the difficulty of knowing how wide is the scope of a single decision. By approved canons a court wisely confines itself to the decision required by the facts; and technically the decision, as distinguished from dictum, does not extend beyond the issue or issues which must be settled to dispose of the dispute. Yet often the reasons given in the court's supporting opinion warrant the belief that the principle on which the decision rests is broad enough to embrace a much wider range of facts. Nevertheless later the decision may be narrowly limited to the minimum grounds sufficient to support it. On the other hand, a court in deciding a case may lay stress on each individual element so as to leave itself unfettered by precedent when presented with a new problem containing any variant in the facts. Seldom are two cases exactly on all fours. When they are, there is not likely to be litigation unless a contender fights chiefly for delay or is ready to bet that a court will change its mind. Almost always there is the question whether the differences in the facts are enough to make a difference in result. Hence the law remains a congeries of particulars but imperfectly subsumed under general principles.

One aspect of this perennial problem of uncertainty appears in *Jacobson v. Massachusetts* [1] which in 1905 by a vote of seven to two sustained a compulsory vaccination law. The particular statute vested power in Boards of Health to require vaccination when in their opinion it was necessary to the public health. There was an exception in favor of children who present a certificate, signed by a registered physician, that they are unfit subjects for vaccination. There was no such exception in favor of adults. The adult convicted of violating the statute by refusing to comply with an order did not allege that he was in fact an unfit subject for vaccination. He did not present or ask leave to present any physician's certificate. Smallpox was prevalent to some extent in the city at the time of the Board's order. The defendant sought to introduce evidence tending to show the ineffectiveness and the dangers of inoculation. The evidence was excluded by the trial court. On this state of facts, the conviction was sustained by the Supreme Court of the United States. The compulsory requirement was held under the circumstances to be within the police power of the state for the protection of health.

We must go to the opinion of the Court to attempt to ascertain how far the decision goes. The refusal to hear the evidence offered by the defendant was justified on the ground that it went only to a dispute between two theories. The Court knew judicially (i.e., without having to take formal evidence) that the theory favoring vaccination accords with common belief. It said that it must assume that the state was not unaware of the opposing theories and that it was compelled of necessity to choose between them. This, it had power to do. "It was not compelled to commit a matter involving the public health and safety to the final decision of a court or jury." [2] This declaration, isolated from the rest of the opinion, would seem to go far to sanction all sorts of compulsory inoculation for all sorts of menaces however disputable and disputed their value. But the Court had pointed out that vaccination was favored by "common belief." [3] It cited legislation in England beginning in 1808 which encouraged or compelled vaccination. The Court knew what every other sensible person knew, and this knowledge lay in the background of its decision and opinion and must be recognized in qualification of occasional statements of broad general tenor.

Thus, as the decision does not go beyond vaccination against smallpox, so it does not surely go beyond compulsion when the malady is prevalent. For after invoking recitals of such prevalence in the order of the Board of Health, the opinion continued:

"If such was the situation,—and nothing is asserted or appears in the record to the contrary,—if we are to attach any value whatever to the knowledge which, it is safe to affirm, is common to all civilized peoples touching smallpox and the methods most usually employed to eradicate that disease, it cannot be adjudged that the present

[1] 197 U. S. 11 (1905).
[2] *Id.* at 30.
[3] *Ibid.*

regulation of the board of health was not necessary in order to protect the public health and secure the public safety. Smallpox being prevalent and increasing at Cambridge, the court would usurp the functions of another branch of government if it adjudged, as matter of law, that the mode adopted under the sanction of the state to protect the people at large was arbitrary, and not justified by the necessities of the case. We say necessities of the case, because it might be that an acknowledged power of a local community to protect itself against an epidemic threatening the safety of all might be exercised in particular circumstances and in reference to particular persons in such an arbitrary, unreasonable manner, or might go so far beyond what was reasonably required for the safety of the public, as to authorize or compel the courts to interfere for the protection of such persons." [4]

Here is warning enough that the Court is going only so far as the particular circumstances require. A more specific caveat appears in the treatment of the apparent absoluteness of the statute in dealing with adults. Although it was held to be a reasonable classification for the statute not to embrace adults in an exception in favor of children presenting a physician's certificate of unfitness for vaccination, this holding was substantially nullified by saying that there might be extreme cases in which the Court would interfere and by in effect importing into the statute a dispensation for abnormal adults. After saying that general language should be interpreted to exclude injustice, oppression, or an absurd consequence, the opinion continues:

"Until otherwise informed by the highest court of Massachusetts, we are not inclined to hold that the statute establishes the absolute rule that an adult must be vaccinated if it be apparent or can be shown with reasonable certainty that he is not at the time a fit subject of vaccination, or that vaccination, by reason of his then condition, would seriously impair his health, or probably cause his death. No such case is here presented." [5]

This does not say that an adult who failed to make any appearance to claim a dispensation could escape from punishment by later evidence before a court. It does not say with certainty that failure to excuse an adult with a certificate would render compulsory vaccination unconstitutional. It seeks to avoid the issue by suggesting to the state court that it should read an exception into the statute. Such a hint would in all likelihood be taken by state courts. Such exceptions should be accorded by any sensible Board of Health without advice from any legislature or court, if there were reasonable grounds for confidence in the certifying physician. Doubtless in some fashion the dispensations have been granted if requests have been made, for the Supreme Court has had no subsequent controversy presenting the issue for formal adjudication. Its caution in favor of individualization must have been heeded widely. Constitutional law is permeated with similar cautions against extreme and unusual applications of statutes found not objectionable in general. The cautions have not infrequently been translated into condemnations. Particularity is of the essence of constitutional law, as it is a major theme of this effort at diagnosis.

[4] 197 U. S., at 27–28.
[5] *Id.* at 39.

Although the Court saved itself from sanctioning compulsory vaccination except when smallpox is in the vicinage, it must be doubted whether this condition would be insisted upon. Some state courts in construing broad powers vested in School Boards and Boards of Health to take action to protect the public health have drawn the distinction between seasons of epidemic and the absence thereof. The cases are not recent ones, and they are not to be commended for good sense. A stitch in time saves nine, and the time to lock the barn is before the horse is stolen. At any rate where legislative authority to compel vaccination is explicitly conferred, it is unthinkable that at this late date a court would say that the vague due process clause forbids precaution and requires procrastination until the presence of pestilence. Common sense forbids us to believe that judicial sanction of compulsion in time of epidemic carries with it a negative pregnant that compulsion is unconstitutional otherwise.

One other observation in the opinion deserves mention. After referring to the liberty of a person to live and work where he will, it is added that "yet he may be compelled, by force if need be, against his will and without regard to his personal wishes or his pecuniary interests, or even his religious or political convictions, to take his place in the ranks of the army of his country, and risk the chance of being shot down in its defense." [6] This was not pertinent to the case at bar except for pointing out that personal liberty is not absolute. Mr. Jacobson advanced no objections on conscientious or religious grounds. Yet one wonders whether the Court did not mention religion in order to forestall any claims of conscience against health laws. Some queer sects do raise such objections. Other more numerous religionists object to some other compulsions affecting bodily integrity. Such objections have sometimes prevailed with legislatures. They may have influenced some state courts even though they have not been the explicit basis of decision. Thus far, however, it cannot be said that they have carried weight with the United States Supreme Court. This brings us to another topic.

In 1927 in *Buck v. Bell* [7] the Supreme Court by a vote of eight to one sustained a sterilization statute. In 1942 in *Skinner v. Oklahoma* [8] it unanimously condemned another one. Our problem is to try to guess whether the later decision indicates a total or partial recantation of the earlier one or whether it indicates merely that a state must provide adequate safeguards and move within a restricted area when it commands the extinction of procreative power. On the facts there is the clearest distinction between the two cases. The Virginia statute sustained in *Buck v. Bell* applied only to mental defectives confined in institutions and it provided elaborate procedure for notice, hearing and appeals. Miss Buck was a feeble-minded daughter of a feeble-minded mother and a feeble-minded mother of a feeble-minded daughter. Mr. Justice Holmes declared that "The principle that sustains

[6] *Id.* at 29.
[7] 274 U. S. 200 (1927).
[8] 316 U. S. 535 (1942).

compulsory vaccination is broad enough to cover cutting the Fallopian tubes" [9] and that "Three generations of imbeciles are enough." [10] Mr. Justice Butler dissented, but since he gave no opinion we do not know whether he would think that we needed six or a dozen such generations instead of a meager three.

In *Buck v. Bell* there was no attack on the procedure required by the statute and scrupulously followed in the particular case. There was criticism that equal protection was denied because the statute applied only to those confined in institutions and not to the multitudes outside. This was easily met by the general rule of reasonable classification and by the more special retort that "Of course so far as the operations enable those who otherwise must be kept confined to be returned to the world, and thus open the asylum to others, the equality aimed at will be more nearly reached." [11] On the substantive issue, the brief on behalf of Miss Buck did not adduce any religious grounds. It asserted that the operation is unrelated to health or morals, and that the right to bodily integrity is an absolute one. In rejecting the contention Mr. Justice Holmes went further than was his usual custom and indicated affirmative approval of the state's policy when he said:

> "We have seen more than once that the public welfare may call upon the best citizens for their lives. It would be strange if it could not call upon those who already sap the strength of the state for these lesser sacrifices, often not felt to be such by those concerned, in order to prevent our being swamped with incompetence. It is better for all the world, if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind." [12]

Turning now to the condemnation visited on the other statute in *Skinner v. Oklahoma* the main concern should be that of the psychologist or the psychiatrist rather than any expert in black letter law. The interesting thing about the decision is that seven members of the Court refrained from passing any judgment on the underlying issue of permanent significance. They condemned the statute solely for discrimination and in the particular case because it applied to triple offenders who commit larceny but not to those who commit embezzlement. This, they held to be a denial of equal protection of the laws. The defect could readily be remedied by an amendment embracing embezzlers. Then one or two more fundamental issues would have to be faced. One of them was faced by Mr. Chief Justice Stone when he concurred on the sole ground that the statute afforded to the prospective victim no opportunity to show that his criminal tendencies are not of an inheritable type. With this, Mr. Justice Jackson agreed. He also agreed that the discrimination against thieves as contrasted with embezzlers offends against

[9] 274 U. S., at 207.
[10] *Ibid.*
[11] 274 U. S., at 208.
[12] *Id.* at 207.

the requirement of equal protection of the laws. He disagreed with each of the other two opinions "in so far as it rejects or minimizes the grounds taken by the other." [13]

There must have been some reason why eight members of the Court thought it important to lay stress on the discrimination point and why seven wished to do nothing more. In general the fact that a statute doesn't go so far as it reasonably might has not in recent years been a basis for condemnation. Mr. Justice Douglas in the opinion of the Court gives general recognition of this in quoting with approval from *Buck v. Bell* the statement that "the law does all that is needed when it does all that it can, indicates a policy, applies it to all within the lines, and seeks to bring within the lines all similarly situated so far and so fast as its means allow." [14] He, however, then goes on to point out that this particular legislation "involves one of the basic civil rights of man" [15] and elaborates on the possibility of its application as a weapon of discrimination against a particular race or nationality.[16]

The cases cited for these views are ones involving members of the Chinese and colored races. Such invocation suggests that the judges were less concerned with the triviality of the distinctions between larcency and embezzlement than with the desirability of setting up a barrier against legislative race discrimination. While they emphasize the severe and irrevocable deprivation from sterilization, they say that they do so not to reëxamine the scope of the police power of the state. Clearly what they most fear is that sterilization may be employed as a weapon of class hostility. It would seem that they would not trust the safeguard of a hearing on the individual's potentiality of communicating criminal traits, for they refrain from joining with the Chief Justice on this point. Even with the safeguard of a hearing, there could be discrimination in administration merely by refraining from proceeding against those of a preferred class. The case does not reveal to what race the petitioner belonged. The first of his three convictions was for stealing chickens. The case came from Oklahoma. Oklahoma has been

[13] 316 U. S., at 546.

[14] *Id.* at 540, quoted from 274 U. S., at 208.

[15] 316 U. S., at 541.

[16] "Marriage and procreation are fundamental to the very existence and survival of the race. The power to sterilize, if exercised, may have subtle, far-reaching and devastating effects. In evil or reckless hands it can cause races or types which are inimical to the dominant group to wither and disappear. There is no redemption for the individual whom the law touches. Any experiment which the State conducts is to his irreparable injury. He is forever deprived of a basic liberty. We mention these matters not to reëxamine the scope of the police power of the States. We advert to them merely in emphasis of our view that strict scrutiny of the classification which a State makes in a sterilization law is essential, lest unwittingly, or otherwise, invidious discriminations are made against groups or types of individuals in violation of the constitutional guaranty of just and equal laws. The guaranty of 'equal protection of the laws is a pledge of the protection of equal laws.' *Yick Wo v. Hopkins*, 118 U. S. 356, 369. When the law lays an unequal hand on those who have committed intrinsically the same quality of offense and sterilizes one and not the other, it has made as invidious a discrimination as if it had selected a particular race or nationality for oppressive treatment. *Yick Wo v. Hopkins, supra; Gaines v. Canada*, 305 U. S. 337." (316 U. S., at 541.)

rebuked by the Supreme Court in other matters in which racial issues were involved.[17]

In certain sections of the country the possibility of a considerable degree of racial discrimination would be present in a statute dealing with all habitual criminals as determined by three convictions for felony. One can hardly say that there was no warrant for this judicial emphasis on discrimination, though one must wonder somewhat why there was unwillingness to join in the objection to lack of a hearing on the issue of transmissibility in the individual case. Even if the Chief Justice's sole reliance on the absence of a hearing might on its face suggest a possible negative pregnant that there was no other substantive defect, Mr. Justice Douglas protected himself and his seven colleagues from any complicity in such an inference by saying explicitly of all objections other than that of discrimination that "we pass those points without intimating an opinion on them." [18] Nor does he anywhere seem to intimate any opinion except as to the fundamental nature of the civil right involved and the danger of its invasion as a weapon of discrimination. It is unthinkable that he and those for whom he wrote would not insist upon a hearing even in a non-discriminatory law. Hence in the absence of any knowledge of what went on in conference, one can only venture the notion that they thought or felt that it would emphasize the menace of class discrimination if it were made the exclusive basis of condemnation.

The Chief Justice, though technically he confines himself to the absence of a hearing, intimates a doubt whether criminality is physically transmissible. In objecting to basing the decision on discrimination he says:

> "Moreover, if we must presume that the legislature knows—what science has been unable to ascertain—that the criminal tendencies of any class of habitual offenders are transmissible regardless of the varying mental characteristics of its individuals, I should suppose that we must likewise presume that the legislature, in its wisdom, knows that the criminal tendencies of some classes of offenders are more likely to be transmitted than those of others." [19]

And later, in a passage which seems to reaffirm *Buck v. Bell* and to point a difference between the statute there and the one before the court, he adds:

> "Science has found and the law has recognized that there are certain types of mental deficiency associated with delinquency which are inheritable. But the State does not contend—nor can there be any pretense—that either common knowledge or experience, or scientific investigation, has given assurance that the criminal tendencies of any class of habitual offenders are universally or even generally inheritable." [20]

These two passages make it extremely likely that the Chief Justice would scrutinize severely any finding by physicians that any individual would be likely to breed criminals merely because he had been thrice convicted him-

[17] See *Guinn v. United States*, 238 U. S. 347 (1915); *Lane v. Wilson*, 307 U. S. 268 (1939).

[18] 316 U. S., at 538.

[19] *Id.* at 544.

[20] *Id.* at 545.

self. It would seem that at most he would be satisfied only by other findings of physical and mental degeneracy comparable to those made in the case of Miss Buck.

Mr. Justice Jackson in his special concurrence clearly intimates that he thinks a fundamental constitutional issue would remain even if the defects of discrimination and absence of hearing were cured. He does not even go so far as to give clear approval to *Buck v. Bell* when he merely recites the fact that "This Court has sustained" [21] the compulsion under the particular circumstances there existing. This is quite different from the Chief Justice's statement that "Undoubtedly a state may" [22] compel what was sanctioned in *Buck v. Bell.* Quite frequently during the current judicial dispensation, mere recitals of former rulings and of the grounds which predecessors adduced for them have been indications of a disposition to qualify or reject rather than to reaffirm. While to Mr. Justice Holmes his reference to three generations of imbeciles may have been merely a superfluous rhetorical rivet, its repetition by Mr. Justice Jackson may possibly be designed to turn it into a more or less essential condition. Should any such requirement be judicially imposed, the state would find it more practical to deal with habitual offenders by stone walls and iron bars rather than by the surgeon's knife.

So much for what Justices of the United States Supreme Court have said and done. The recital does not throw much light on what they or their successors would do with milder eugenic measures, except to make clear that they would be zealous in insisting upon strong scientific support for the necessity and the efficacy of prophylactic prescriptions and upon adequate procedural safeguards in picking the persons subjected to them. A materialist might find it somewhat sentimental to emphasize the sacredness of procreative power when for habitual offenders there may be deprivation of all opportunity for its exercise. There are, however, other than materialistic elements in the problem, ones that in certain tightly knit fellowships would obtain even if the state did no more than to proffer sterility as the price of release from long prospective incarceration. From a practical standpoint such release would mean the relinquishment of the most adequate safeguard against continued criminal enterprise by an already practiced and proficient offender.

If all this seems sadly vague and amorphous to those who extract certainties out of test tubes, it can only be answered that of such is the kingdom of jurisprudence. Even in the kingdom of the healing art one does not always find complete concord and certainty. One who listens to the nauseating promulgation of nostrums on the radio must turn in increased confidence to the more modest and tentative approach of the physician. The sin of the law is not that it is empirical and particularistic but that so often it professes to derive from the universal and the absolute. This is especially foolish when courts exercise power over legislatures in the name of un-

[21] *Id.* at 546.
[22] *Id.* at 544.

enlightening constitutional cautions. Happily the practice not only does not accord with the profession, but is far superior. Strange as it may seem that we have a system of government under which five lawyers on a bench in Washington can say "No" when a state legislature and a state court have said "Yes" and base their negative on their views of social policy, it would be hard to maintain that there was not wisdom in making a distinction between the case of Mr. Skinner and that of Miss Buck.

There is nothing in the law books which would give a lawyer any special competence to pass judgment on what the Supreme Court would say about other eugenic measures less drastic than sterilization and more far reaching and invasive than vaccination. The immediacy of danger from contagious and infectious diseases, the substantial certainty of a fair degree of efficacy from recognized curative and preventive measures, the avoidance of finality in their application—these and other considerations should keep the decision in *Skinner v. Oklahoma* from being a stumbling block in the way of any sane public health program however much it may intrude on privacy and preclude self-determination. There are, of course, sects which don't believe in medicine at all and other sects which object to the intrusion of animal substances, but the time has not yet come when their tenets are likely to carry even subconscious weight with the Supreme Court as claimants for inclusion in the protection surrounding civil or religious liberty. Whether they may in some areas have weight with state legislatures and state courts is somewhat less certain. Voters may carry weight by their numbers quite as much as by their reason.

One final point may deserve mention. If the Supreme Court is satisfied that a measure belongs in the field of public health and is not patently or covertly punitive in design, the intervention of a jury is not necessary in the determination of the facts in the individual case. This is established by *Buck v. Bell* and by *Minnesota ex rel. Pearson v. Probate Court*,[23] subject always to the qualification that precedents continue to be followed. The *Pearson* case involved the commitment of a so-called "psychopathic personality" to an institution. Except for the intervention of a jury, the proceedings before the Probate Court and on appeal were scrupulously protective against the danger of error. As to the compulsory appointment of two physicians to assist in the examination, the Court said that "The argument that these doctors may not be sufficiently expert in this type of cases merely invites conjecture. There is no reason to doubt that qualified medical men are usually available." [24] Such faith should be welcome to the medical profession. It would be an extreme legalist who could say as much for the general run of jurors. Some, of course, may question the infallibility of judges, but under our system they have the final say if duly invited to say it.

[23] 309 U. S. 270 (1940).
[24] *Id.* at 276.

THE DOCTOR'S FEDERAL TAXES*

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DURING the period of the first world war, the maximum amount which was raised by taxes in any one year was $5,400,000,000. Our present tax laws are yielding more than five times that amount, and the President's budget message for 1943 asks for additional taxes which will greatly increase the present total. Tax rates have necessarily gone steadily higher while exemptions have gone lower, and there are very few in the community now who do not feel directly the burden of federal tax collection.

The modern income tax dates from 1913, in which year the Sixteenth Amendment to the Constitution was adopted.[1] Since that time Congress has adopted many revenue laws, and at the present time the income tax is a very refined and exceedingly complex instrument. We often hear pleas that the tax laws should be simple so that every citizen might easily know his duties and responsibilities. But experience has shown that this cannot be. A simple income tax could be drawn, but it would be full of harsh unfairnesses on the one hand, and loopholes on the other. As tax rates go higher, it has been necessary to introduce many new provisions into the law to alleviate burdens and prevent escape. Fortunately, however, many of the more complex sections have no application to the ordinary taxpayer.

The body of the tax law is contained in the Internal Revenue Code. This is a codification of the tax statutes which was adopted by Congress in 1939, and references in this article to sections are to the sections of the Code, including the numerous amendments which have been adopted in the past four years. In addition to the statute, there is a great mass of other materials which may have bearing on the solution of a tax problem. Pursuant to authority granted in the statute, the Commissioner of Internal Revenue issues a large quantity of regulations. These represent the official interpretation of the law, and in many situations have much the same force and effect as if Congress had itself adopted them. In addition, there are many administrative opinions and rulings by the Revenue authorities. These are published weekly in the Internal Revenue Bulletin, and twice a year are gathered into a volume known as the Cumulative Bulletin. Finally, there are many thousands of decisions of the courts which have interpreted and applied the various provisions of the statute. These start with the Tax Court of the United States, known until recently as the Board of Tax Appeals, which turns out over a thousand tax decisions a year. But tax cases

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[1] The Sixteenth Amendment provides: "The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration."

This was made necessary by the unfortunate decision of the Supreme Court in 1895 in *Pollock v. Farmer's Loan & Trust Co.*, 158 U. S. 601.

are also being constantly decided by the federal District Courts, the Circuit Courts of Appeals, and by the Supreme Court. These are the materials which must be consulted on any difficult point in the tax law. There is much that is very difficult; but there is also, fortunately, a large area in which the application of the tax is fairly certain.

The Income Subject to Tax

The tax is imposed on *net income,* which consists of gross income less certain deductions and credits (or exemptions). Thus we must start with *gross income,* and we find that it is defined in very sweeping terms. Section 22 (a) of the Code provides that " 'Gross income' includes gains, profits, and income derived from salaries, wages, or compensation for personal service . . . of whatever kind and in whatever form paid, or from professions, vocations, trades and businesses, commerce, or sales, or dealings in property . . .; also from interest, rent, dividends, securities, or the transaction of any business carried on for gain or profit, or gains and profits and income derived from any source whatever."

Specifically, this means that the doctor must include in gross income all of his fees, any salary he may have, either from a medical school or clinic, or from any one else by whom he may be employed, and also any dividends, interest, rent or other income which he may have. The Supreme Court has held that this section "indicates the purpose of Congress to use the full measure of its taxing power within those definable categories." [2] There are only a few items of receipts which are expressly exempted from the tax. These include gifts and inheritances,[3] the proceeds of life insurance payable by reason of the death of the insured,[4] and amounts received as compensation for personal injuries or sickness.[5] But except for these specific items, the sweep of the definition of gross income is very great, and reaches to every item of receipts of every individual.[6] And the receipts need not be in cash. The value of any property or benefit received is subject to the tax.

[2] *Helvering v. Clifford,* 309 U. S. 331, 334 (1940).

[3] Section 22(b)(3). A receipt is not a gift unless it is purely gratuitous. It does not have to be paid pursuant to a strict contract or after sending a bill, to be income. Thus, if a doctor renders professional services, and the patient thereafter sends in a check without any agreement or bill, the entire amount is income, even though it is more than the bill which the doctor would have sent for the services.

[4] Section 22(b)(1). The exemption applies even where the proceeds of the insurance are payable in installments, as in the form of an annuity payable to the decedent's widow for her life. In such a case a portion of each payment to the widow is (from the insurance company's point of view) income on the money left with the company. But several cases have held that the entire amount of such payments is exempt from income tax. *Commissioner v. Winslow,* 113 F.(2d) 418 (C.C.A. 1st, 1940); *Commissioner v. Bartlett,* 113 F.(2d) 766 (C.C.A. 2d, 1940); *Allis v. LaBudde,* 128 F.(2d) 838 (C.C.A. 7th, 1942); *Kaufman v. United States,* 131 F.(2d) 854 (C.C.A. 4th, 1942). The Treasury has now accepted this view, T. D. 5231, issued February 22, 1943.

[5] Section 22(b)(5).

[6] The proceeds from the sale of property are not income to the extent that they represent a return of capital or investment. Thus if property costing $800 is sold for $1,000, $1,000 is received, but only $200 is income. The amount to be included in "gross income" may be reduced by the provisions of the statute dealing with capital gains. Section 117.

Thus the value of board and room is taxable, if it is received as compensation for services,[7] and the same rule applies to an automobile or other thing of value which might be received from a grateful patient.

Accounting Methods. Since the income tax is imposed on a periodic basis, it becomes necessary to determine in many cases the period for which an item should be reported as gross income. Two principal methods of accounting are recognized for tax purposes, and either one may be adopted by an individual taxpayer. The method most widely used by individuals is the *cash* method. This means that income is reported for the period within which it was *received,* and deductions are taken for the period when they were *paid.* This is the simple method, and is usually quite satisfactory for most persons whose income is chiefly from a salary or fees. Some questions can arise. For example, income is received when a check is received, at least if the check was thereafter paid in due course. Thus a check mailed on December 31 and received on January 2 is taxable as income for the later period.[8] On the other hand, some items are taxable on the cash basis, even though they have not been received. This is called constructive receipt, and applies to items which are unqualifiedly subject to the taxpayer's demand. Examples of such items are savings bank interest which is taxable though not withdrawn, matured bond coupons, and a drawing account, where the taxpayer is taxable on the amount he can withdraw whether he does withdraw it or not.

The other method of accounting is the *accrual* basis. Most business organizations make their returns on this basis, and an individual can do so if he chooses.[9] On this basis, an item is taxable as income for the period when it *accrues,* and an item may be deducted for the period within which it is *incurred.* The time of receipt or payment is immaterial. This method more accurately reflects the economic return for the efforts of a given period, since the time of actual collection or payment may in many cases be largely fortuitous. Under the accrual method a doctor would report his fees as income for the period within which they were billed, and the time of actual collection would not affect the tax. Of course some of the fees billed will not be collected, and a deduction is allowed for bad debts at the time they become worthless,[10] or a reserve may be set up for bad debts, and reasonable additions to this reserve may be deducted in each period. Where the cash method is used, uncollectible fees do not give rise to any deduction for a bad

[7] Sec. 19.22(a)–3 of Regulations of 103 provides: "If services are paid for with something other than money, the fair market value of the thing taken in payment is the amount to be included as income."

[8] *Avery v. Commissioner,* 292 U. S. 210 (1934).

[9] Although either method may be chosen, a taxpayer who has adopted one method may not change to the other unless he obtains the permission of the Commissioner of Internal Revenue. Thus, persons who have heretofore used the cash method must continue on that basis unless they seek and obtain the required permission.

[10] Sec. 23(k) of the Code. Until recently the bad debt deduction was very technical, and required that the debt be both "ascertained to be worthless" and "charged off" during the taxable year. This was changed by the Revenue Act of 1942 to allow the deduction simply of "Debts which become worthless within the taxable year."

debt, since they have never been included in income. They are simply income which the taxpayer hoped to get but never did, and are thus neither income nor a basis for deduction.

Deductions

After the gross income has been ascertained, there is naturally much interest in determining the deductions. The statute allows the deduction of interest payments,[11] taxes,[12] business losses, and losses of property arising from "fires, storms, shipwreck, or other casualty, or from theft," [13] bad debts,[14] and charitable contributions.[15] Probably the most important deduction in many cases is that allowed for "All the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business." [16] Under this provision, a doctor may deduct his office rent, fuel, water, light, telephone, and supplies for office use, and any professional expenses,[17] such as dues in medical societies, subscriptions to medical journals,[18] and travelling and other expenses in attending medical conventions.[19] In an

[11] Sec. 23(b).

[12] Sec. 23(c). But federal income taxes are not deductible (state income taxes paid may be deducted in computing the federal tax); nor may any deduction be taken for inheritance, estate or gift taxes. Assessments made for special benefits, such as improving a street, are not deductible; they are treated as an addition to the cost of the property benefited. Taxes may be deducted only by the person on whom they are imposed as taxes. It is not enough that the economic burden is borne by the person claiming the deduction. Thus a tax imposed on a manufacturer cannot be deducted by the purchaser even though the amount of the tax is included in the purchase price. For this reason, the federal tax on gasoline is not deductible by the consumer. Nor may the federal taxes on liquor or tobacco or on retail sales (such as the tax on silver and jewelry) be deducted by the purchaser. Sec. 23(c)(3) was added to the Code by the 1942 Act to provide that state retail sales taxes may be deducted by the purchaser regardless of whether he actually pays it as tax or as an addition to the purchase price.

The taxes which may be deducted include those on admissions, club dues, safe deposit boxes, telephone bills and telegraph messages, state income taxes, state or local taxes on land and personal property (other than benefit assessments as indicated above), taxes on railroad tickets, poll tax, automobile taxes, stamp taxes on transfers of stocks, bonds and real estate, and any tax which a doctor may have to pay in order to dispense narcotics.

[13] Sec. 23(e).

[14] Sec. 23(k).

[15] Sec. 23(o). The amount deductible for charitable gifts is limited to 15 per cent of the net income (computed without taking charitable contributions into account).

[16] Sec. 23(a)(1)(A).

[17] Sec. 19.23(a)-5 of Regulations 103: "Professional expenses.—A professional man may claim as deductions the cost of supplies used by him in the practice of his profession, expenses paid in the operation and repair of an automobile used in making professional calls, dues to professional societies and subscriptions to professional journals, the rent paid for office rooms, the cost of the fuel, light, water, telephone, etc., used in such offices, and the hire of office assistants. Amounts currently expended for books, furniture, and professional instruments and equipment, the useful life of which is short, may be deducted."

[18] It has been held in several cases that amounts expended by a physician for railroad fare, hotel accommodations and meals in connection with attending meetings and conventions of medical societies is deductible as an ordinary and necessary expense. *Cecil M. Jake,* 13 B.T.A. 726 (1928); *J. Bentley Squier,* 13 B.T.A. 1223 (1928); *Roy Upham,* 16 B.T.A. 950 (1929); *Robert C. Coffey,* 21 B.T.A. 1242 (1931); *Wolfe v. McCaughn,* 17 A.F.T.R. 1007 (E.D. Pa. 1933). The Bureau of Internal Revenue now follows this view. I.T. 2602, X-2 Cum. Bull. 130 (1931).

[19] Of course, the expenses deductible are those of the physician himself. They do not include the expenses of his wife and family who may accompany him. Nor do they include purely recreational expenses, such as the cost of a side trip made on the way to or from the convention.

early ruling it was held that the expenses of doctors in taking postgraduate courses in schools were deemed to be personal expenses, and thus not deductible.[20] It is far from clear, though, that this ruling would be followed now.

Another item of expenditure which is clearly deductible on the doctor's income tax return is the amount of wages and salaries paid to any employees. These may be salaries paid to office employees, such as receptionists or nurses, or to technicians or to other doctors who may be in the taxpayer's employ. The only restriction that the statute puts on the deduction of such items is that they be "a reasonable allowance for . . . personal services actually rendered." [21] Thus a salary paid which under the circumstances was so large as to amount to a gift would not be deductible beyond the amount of reasonable compensation. Such a payment would be subject to particular scrutiny where the payee was the taxpayer's wife or other relative. A payment by way of pension is deductible, however, where it is reasonably related to past services rendered.[22]

A new provision added to the Revenue Act of 1942 makes it possible now to deduct expenses incurred in connection with the production of taxable income, even though they are not connected with the taxpayer's trade, business or profession.[23] Under this clause, deductions may be had for costs incurred in connection with the management and protection of investments, such as the cost of a safe deposit box [24] or the expenses of a custodian or advisor in supervising and handling the investments. This section also makes it clear that the expenses of investment in real estate, including depreciation, may be deducted on the tax return.

Personal Expenses. The statute expressly provides that "Personal, living, or family expenses," may not be deducted.[25] This prevents the deduction of the cost of the taxpayer's home, his clothes, his food, the expenses of his children, including the cost of their schools, camps, or other care. Similarly, wages paid to household or domestic employees are not deductible. The Treasury has recently ruled that examination fees and other expenses paid by physicians for securing the right to practice their profession are personal expenses and may not be deducted. This applies also to the basic cost of obtaining a medical education.[26] Similarly, the cost of insurance on the taxpayer's house or personal automobile (not used for business) is a personal expense, and is not deductible. For the same reason, life insurance

[20] O.D. 984, 5 Cum. Bull. 171 (1921).

[21] Sec. 23(a)(1) of the Code.

[22] Compare the decision in *Waters F. Burrows*, 38 B.T.A. 236 (1938), where it was held that expenses of practicing medicine in previous years but paid in the current year by a doctor on the cash basis were deductible, even though he had retired from active practice before the expenses were actually paid.

[23] Sec. 23(a)(2) of the Code, added by § 121 of the Revenue Act of 1942.

[24] But only if the box is used for the protection of income producing property. Thus no deduction is allowed for the cost of a safe deposit box used for jewelry, silverware, or for fire insurance policies or the deeds to the taxpayer's own residence. See § 19.23(a)-15 of Regulations 103, added by T.D. 5196, Internal Revenue Bulletin, December 14, 1942, p. 39, 42.

[25] Sec. 24(a)(1) of the Code.

[26] Sec. 19.23(a)-15 of Regulations 103, added by T.D. 5196, Internal Revenue Bulletin, December 14, 1942, pp. 39, 41-42.

premiums and premiums paid on health and accident insurance policies may not be deducted. But the cost of a doctor's insurance against liability for injuries to patients and claims for malpractice may be deducted, since that is an ordinary and necessary part of the expense of carrying on the profession.

In many cases the line between professional and personal expenses is far from clear. It has been particularly hard to draw this line in the case of uniforms worn by nurses, surgeons and others engaged in medical work. These are the personal attire of the persons wearing them, yet it is equally obvious that they are worn for professional purposes, and represent to a considerable extent an extra professional expense. There is an early ruling that these costs may not be deducted,[27] but there is reason to believe that the official view on this may have changed, at least where the article of clothing is "unsuited to wear outside of working hours." [28]

Another instance of the line between personal and professional expenses is in the deduction for rent. If a doctor maintains an office separate from his home, the rent of the office is clearly deductible. But the rent of his home is not deductible, even though he receives occasional patients there. If, however, he maintains a separate portion of his home as an office in which patients are regularly received, then he may deduct the portion of his rent that is fairly attributable to the office.[29] The situation is similar as to the expenses of operating an automobile. If the car is used partly for personal use, and partly for professional calls, then a proper proportion of the expenses of gasoline, oil, repairs, and other costs of operation may be deducted. The cost of the car itself is not deductible for reasons which are stated in the next paragraph, but a similar proportion of the depreciation sustained on the car may be deducted. If the car is used entirely for professional purposes, then all the expenses of operation are deductible, including all of the allowance for depreciation.

Capital Expenditures. Another line has to be drawn in the matter of deductions between what may be called current expenses on the one hand, and capital expenditures on the other. "Ordinary and necessary expenses" are deductible, but the cost of anything which amounts to a capital investment may not be deducted at the time of acquisition. The cost is instead recovered for tax purposes through a depreciation allowance spread over the life of the article. It is not always easy to decide whether an item may be deducted or must be capitalized, but a rough and ready test may be found by saying that if it will last more than about three years it must ordinarily be

[27] I.T. 1488, I–2 Cum. Bull. 145 (1922).

[28] See G.C.M. 19662, 1938–1 Cum. Bull. 168, and G.C.M. 19790, 1938–1 Cum. Bull. 118, where it was held that the cost of uniforms worn by jockeys and baseball players can be deducted. If doctors can bring themselves within this class they would seem to be entitled to the deduction; and there would seem to be no reason for a distinction—as far as this question is concerned.

[29] Sec. 19.24–1 of Regulations 103: ". . . In the case of a professional man who rents a property for residential purposes, but incidentally receives clients, patients, or callers there in connection with his professional work (his place of business being elsewhere), no part of the rent is deductible as a business expense. If, however, he uses part of the house for his office, such portion of the rent as is properly attributable to such office is deductible."

capitalized. A familiar example is an automobile used for business or professional purposes. The investment in an automobile is recoverable through depreciation allowances spread over the life of the car. For an ordinary passenger automobile this period is usually taken as about five years, and thus one-fifth of the cost is deductible in each of the first five years the car is owned. After the full cost has been made up by depreciation allowances, no further deduction can be had. Similar questions may arise with respect to books, and various items of professional equipment, ranging from typewriters to roentgen-ray machines and other items of a professional laboratory. Occasional books bought from time to time may ordinarily be deducted currently, but large sets or the cost of a professional library must ordinarily be recovered through depreciation.[30] Similarly, depreciation is allowable on a building owned by the taxpayer and used as an office, or held for investment, or against the proper proportion of the cost of the taxpayer's residence when he maintains an actual office in the building.

Where depreciation is taken against an item of property, the amount of depreciation allowed is deducted from the cost of the property to determine the taxpayer's remaining capital investment in it, for the purpose of computing gain or loss on a subsequent sale. Thus, if an automobile is purchased for $1,000 and used solely for professional purposes for two years, during which depreciation was allowed at the rate of $200 a year, the taxpayer's remaining capital investment would be $600. If he then sold the car for $700, he would have a taxable gain of $100, although he sold the car for less than he paid for it. On the other hand, if he traded the car in on a new car for professional use, he would have no gain or loss on the trade,[31] and the new car would take as its basis for depreciation the sum of the remaining basis on the old car plus the amount paid in cash to complete the trade. The same is true with respect to any other professional capital asset, such as typewriters, desks and other office furniture, and scientific instruments and equipment used for medical purposes.

Credits

In addition to the deductions, the statute provides for certain credits in the computation of net income which is subjected to the tax. The chief of these are the personal exemption and the credit for dependents. In the 1942 law the exemption is fixed at $1,200 for a married couple or for the "head of a family," and $500 for a single person. In addition to this a credit of $350 is allowed for each dependent child under the age of eighteen, or for any

[30] The Treasury has published a pamphlet known as Bulletin F (1942 edition) which deals with depreciation allowances in some detail. The following appears at page 60: "Professional and Scientific Equipment. Under this heading will come libraries and equipment used in professional activities. The life usually applied to professional libraries is 30 years while the life for scientific equipment used by dentists, doctors, etc., is usually 10 years."

[31] Sec. 112(b)(1) of the Code provides: "No gain or loss shall be recognized if property held for productive use in trade or business . . . is exchanged solely for property of a like kind to be held for productive use in trade or business . . ."

dependent person, regardless of age who is incapable of self support because of mental or physical defects.[32]

Earned Income. The other credit allowed to individuals is the earned income credit.[33] This is available against the normal tax only, and is a credit of 10 per cent of the earned net income, and is deducted in the computation of net income subject to that tax. There are certain rather arbitrary limitations on the computation. The first $3,000 of net income is treated as earned income regardless of its actual source, and in no case is more than $14,000 allowed as earned net income. With the normal tax rate at the present 6 per cent, the effect of the earned income credit is to reduce the tax payable by 6 per cent of 10 per cent of the amount of the earned net income. Thus the earned income credit never results in a saving of more than $84 at the present rates, because of the top limit of $14,000. The income received by a doctor from fees or salary is earned income even though a part of the work is done by employees and assistants under his general direction.[34]

Tax Reduction

With tax rates already at unprecedented heights, it is natural that there should be much interest in devices which will help in tax reduction. During the past decade there has been a good deal of activity to this end, but much of it has saved no taxes and caused much expense and grief in the process. Some tax reduction is fairly obvious. Taxes can be saved by not going to the movies, and staying off trains, and not making long distance calls. It is also desirable for a taxpayer in these days to keep an adequate memorandum book in which he may make proper record of all items of deduction which he may claim on his return, such as all taxes paid, and items of business and professional expense, such as postage used at the office for sending out bills, and so on. A substantial percentage of all of these items can be saved when they are deducted from income at the present rates.

Beyond this the quest for tax reduction leads into the realm of trusts and transfers of property, and this is a field into which no layman should venture without the very best of experienced advice. This is not a plug for the lawyers, but merely a statement that a doctor should not try to deal with such a question on casual suggestions from a friend or a "tax expert" with a service to sell, any more than a lawyer should undertake self-medica-

[32] Sec. 25(b) of the Code.

[33] Sec. 25(a) of the Code.

[34] Sec. 19.25–2 of Regulations 103: "The entire amount received as professional fees may be treated as earned income if the taxpayer is engaged in a professional occupation, such as a doctor or a lawyer, even though he employs assistants to perform part or all of the services, provided the clients or patients are those of the taxpayer and look to the taxpayer as the person responsible for the services performed."

The same rule applies to income received through a professional partnership provided the patients are those of some active member of the partnership and look to him as responsible for the services performed. Mim. 3802, IX–1 Cum. Bull. 121 (1930). See also G.C.M. 9716, X–2 Cum. Bull. 304 (1931). The income of a physician from his practice was held to be income from a trade or business under the 1917 excess profits tax which was applicable to individuals. A.R.M. 40, 2 Cum. Bull. 266 (1920).

tion if he is confronted with a serious or complicated illness. It is also a field in which highly trained advice is eminently desirable. Most doctors doubtless know members of their own profession to whose ministrations they would not want to submit themselves; and lawyers cannot be regarded as fungible, either. Finally, it may be fairly said that the field of trusts and taxes is full of uncertainties which only an expert can keep within his grasp, and the best he can do often is to guess. In about three-fourths of the cases, the best advice that can (and will) be given is, Don't.

There is one thing that a married man can do if he has full confidence in his wife, or is willing to take the chance that she may run off with money he may give her. If the doctor has made some accumulation from his profession, and has invested this in securities, the income from the securities is included in his income and is in effect taxed in his highest bracket. If his total income is above the bottom bracket of surtax, he may save income tax (under the law as it stands today) by transferring the securities to his wife. Then the income from the securities will be taxable to her and in the lower brackets if she has no other income.[35] The gift will be subject to gift tax if it exceeds the annual exemption of $3,000 a year, or the general exemption of $30,000. And it must be clearly understood that an outright unqualified gift to the wife is required. There must be no reservations or strings or understandings of any sort. The transfer will also have the effect of taking the property out of the husband's taxable estate at the time of his death (unless the gift is found to have been made in contemplation of death). But the property will be taxable in the wife's estate on her death, and the husband may have to pay tax then to get his property back. And of course, the income tax saving would be lost if the Treasury should be successful in its efforts to have compulsory joint returns of the income of husband and wife; but so far Congress has consistently rejected that attempt.

Special Problems

There are several special situations dealt with in the law which seem worthy of mention, and which may occasionally arise in connection with a doctor's tax returns. The first two of these to be dealt with relate to the problem of allocating income to a proper period for the purpose of computing the tax payable.

Income Accrued at Date of Death. When a doctor in active practice dies he will ordinarily have a substantial amount of fees due to him for work he has done but for which he has not received payment during his lifetime.

[35] Such a transfer is unnecessary in the eight community property states (Washington, Idaho, California, Nevada, Arizona, New Mexico, Texas, and Louisiana; and optionally in Oklahoma). In those states the income of a doctor from his profession is community property, and is taxable half to him and half to his wife. This results in a substantial discrimination in favor of taxpayers in these states, which would not be tolerated by the residents of other states, if they were fully aware of it. But to date determined efforts to eliminate this unfair arrangement have always fallen before the solid phalanx of sixteen Senators from the community property states.

This is a situation which is not peculiar to doctors, but applies also to lawyers, architects, insurance men, and many others. These items represent assets of the estate of the person who has performed the services. The question is then presented as to how they should be treated when they are eventually collected by the executor after the decedent's death. In some early cases it was held that the amounts collected by the executor were not income to the estate, since they were merely the collection of the estate's assets, in the form of debts due to the estate. This led the Treasury in 1934 to secure the adoption of a clause in the statute which provided that all such items earned but not collected at death should be included as income of the taxpayer for the period ending with his death.[36] In other words they were treated as having accrued at the date of death, and the taxpayer was put on the accrual basis with respect to these items. In due course, this provision was sustained by the Supreme Court, and it was held that the items which must be so accrued included the fair value of all services performed whether they had been billed or not.[37] With the rapid increase in tax rates in the following years, this provision became very unfair, for it resulted in throwing into the taxable income of the final return items of income which might have been earned over a period of several years. As the rates are sharply graduated, this caused a much greater tax than would have been the case if the tax had been spread over a period of several years. This tax would materially reduce the amount which a man in active professional practice could count on leaving to his dependents, since the tax would be a heavy liability against his estate at the time of his death.

Fortunately this difficulty was remedied by Congress in the Revenue Act of 1942. That statute adds a new section to the Code,[38] which makes such income taxable to the person who actually collects it after the decedent's death, less an allowance for the estate tax which may have been paid by reason of the claim being included as an asset of the decedent's estate at his death. This amendment was made retroactive, so that the pyramided tax may be eliminated in the case of any professional person who died before the recent amendment was passed.

Income Earned over a Period of More than 36 Months. Sometimes work is performed over a long period of time, and payment for the services is not received until at or after the close of the period. Very likely this happens to lawyers and others more often than it does to doctors, but there must be many cases in which doctors have to wait more than three years for a fee while performing services during the period. If the fee, when received, is substantial, the tax may be very much greater if it is taxed in full in one period than would have been the case if the fee had been divided up and paid equally during each year in the period, for the tax on a sum received

[36] Sec. 42(a) of the Revenue Act of 1934, continued into § 42(a) of the Internal Revenue Code.

[37] *Helvering v. Estate of Enright*, 312 U. S. 636 (1941).

[38] Sec. 126. The previous provision in § 42(a) was eliminated.

in each of three years is less than the tax on three times the sum received all in one year. This is the result of the sharply graduated rates of taxation.

This difficulty has been alleviated to some extent by a provision included in Section 107 of the Code. Under this section, where at least 80 per cent of the total compensation for personal services covering a period of 36 months or more is received in one taxable year, then the amount so received may be treated for tax purposes as if it had been received ratably over the entire period. In this way the amount received may be spread over the three or more years involved and the total tax due with respect to it shall not exceed the aggregate of the taxes which would have been due if the proportionate amount of the total compensation had been included in each of the years of the period. This is a complicated provision; but it is a fair one. Many of the complications in the tax laws result from efforts of Congress and the taxing authorities to be fair. And the use of this section may save a substantial amount of tax in the occasional case where it is applicable.

Victory Tax. The Revenue Act of 1942 includes a new tax known as the Victory tax. This has given rise to a good deal of confusion, chiefly because of the provisions which it includes for collecting the tax at the source from wages and salaries. Because the tax is withheld only from salary and wage income, the impression has sometimes arisen that only wages and salaries are subject to the tax. Specifically, some doctors have thought that their fees were not subject to the Victory tax. This impression is, however, quite unfounded. The Victory tax is applicable to all taxable income received by any taxpayer, whether derived from salaries, wages, fees, commissions, dividends, interest, rent, or any other source except capital gains. The tax is collected in advance, it is true, only from salaries and wages. But this is merely a collection device. All taxpayers will make a report of Victory tax when they file their returns on March 15, 1944. To the extent that the tax has been collected at the source from salaries and wages, the amount so collected will be a credit against the Victory tax due. But in the case of taxpayers whose income has not been subjected to collection at the source, the entire amount of the Victory tax will be due at that time.

A portion of the Victory tax is in effect a compulsory loan to the Government to be returned after the close of the war. In the case of single persons, this is 25 per cent of the tax, not to exceed $500; and for married persons, it is 40 per cent of the tax, not to exceed $1,000. An additional credit of 2 per cent (limited to $100) is allowed for each dependent. This post-war credit may in effect be taken in advance, because amounts invested in war bonds, or used to pay off debts, or paid on life insurance premiums may be deducted from the tax at the time the return is filed, up to the amount of the credit. If this is done the credit is of course reduced by the amount so deducted.

If the doctor has employees of any sort, whether office or professional, he is required to act as a withholding agent, and deduct the Victory tax from

the wages or other compensation which he pays. (Withholding is not required from the wages of domestic or agricultural employees.) The amount to be deducted is 5 per cent of all of the compensation in excess of $12 a week. The employer is personally liable for the amount of the tax withheld from his employees, and must pay it with a return on the proper form to his local Collector of Internal Revenue after the close of each quarter of the year. The employer must also furnish to each employee after the close of each year (or after the termination of employment) a receipt for the tax withheld on a form prescribed by the Commissioner of Internal Revenue. This is the form which the employee then files with his tax return so that he may secure credit against the Victory tax for the amounts which the employer has paid in advance on his behalf through the withholding collections.

Men in the Armed Services. The salaries of army officers are subject to tax just the same as other income, including the Victory tax (although there is no collection at the source of Victory tax from military and naval personnel on active duty). There has grown up a rule, however, under which the allowances of army and navy officers for quarters, as distinguished from their pay, are not subject to income tax.[39] This arises from the difficulty of drawing a distinction between cases where quarters are furnished primarily for the benefit of the Government and the much more frequent situation where an allowance is made in lieu of quarters. It crept into the regulations when tax rates were low and it did not make very much difference. Under present conditions it results in a very considerable saving of tax, since taxpayers outside of the military forces have to pay full tax on that part of their incomes which they use to cover their rent, food and other living costs. It is thus an indirect increase in the compensation of army and navy officers, which may well be fully warranted, but would be better done directly.

Although an army or navy officer remains fully liable for income tax and Victory tax, the law allows him to defer the payment of any tax falling due during his period of military service if his "ability to pay such tax is materially impaired by reason of such service."[40] This deferment extends until six months after the termination of military service, and no interest is due for the period of deferment, and no penalty may be collected for nonpayment. The statute of limitations is, however, kept open for the period of deferment and for nine months thereafter. Deferment in such cases is not automatic, but may be had on application and a proper showing to the Collector of Internal Revenue. A similar deferment is now given in effect to any person, whether in the armed forces or not, who for more than ninety days "is continuously outside the Americas."[41]

[39] Sec. 19.22(a)-3 of Regulations 103: ". . . The value of quarters furnished to the commissioned officers, chief warrant officers, warrant officers, and enlisted personnel of the Army, Navy, Coast Guard, Coast and Geodetic Survey, and Public Health Service, or amounts received by them as commutation of quarters, are to be excluded from gross income."

[40] Sec. 513 of the Soldiers' and Sailors' Civil Relief Act of 1940, 54 Stat. 1178, 1190.

[41] Sec. 3804 of the Internal Revenue Code, added by the Revenue Act of 1942.

Questions Connected with the Patient's Taxes Which May Be of Interest to Doctors

The doctor is, of course, primarily interested in his own taxes. When tax rates were low and exemptions were high, there could be very few situations where the patient's tax bill could seriously interfere with the patient's obtaining proper treatment or with the doctor's being paid. Where tax rates are higher, however, the taxpayer would in effect get a substantial rebate against his medical expenses if they could be deducted, and this might have some effect on the doctor's collections. But with one important exception to be noted later, it is quite clear that medical costs are personal expenses and are not deductible in the ordinary case.

Where medical or related work has some connection with the taxpayer's trade or business, it has been occasionally argued that the cost could be deducted. In one case, a deduction was allowed to an actor for the cost of dental work required to replace teeth knocked out in making a prize fight picture.[42] But generally such deductions have been denied. An early ruling refused to allow the deduction by a professional singer of amounts paid to a throat specialist for throat treatments.[43] The Board of Tax Appeals refused to allow a motion picture actress to deduct the cost of a tonsillectomy although she contended that it was necessary for the improvement of her voice.[44] In another case an actor and radio performer was denied a deduction of the sum of $3,500 paid for new artificial dentures, although he claimed that the new teeth were necessary to eliminate a hiss and restore perfect enunciation which was required in the conduct of his work.[45] A lawyer sought to vary the claim by contending that the substantial expense of caring for his arthritis was deductible as a "loss" or as a damage by "casualty"; but he was unsuccessful.[46]

Certainly, ordinary medical bills would seem to be a clear case of "Personal, family, and living expenses," which are not deductible. But the doctor is familiar with many cases where there is a medical catastrophe, with hospital and other costs which are overwhelming even to a family which is ordinarily able to pay its way. It does not require imagination to picture a case where the family income is, say, $4,000 a year, and an accident or illness to a child or other member of the family results in costs aggregating the entire family income of $4,000. In such a case, it is rather harsh to tell the taxpayer that he must not only find a way to pay his ordinary living expenses, and the medical bills, but also a sizeable amount for income tax as well. He will find it hard to feel that he has had income when he has finished the year at a substantial loss through no fault of his own.

[42] *Reginald Denny*, 33 B.T.A. 738 (1935). The Commissioner of Internal Revenue has refused to acquiesce in this decision. XV–1 Cum. Bull. 30 (1936).
[43] O.D. 1032, 5 Cum. Bull. 172 (1921).
[44] *Madge Evans*, Memo. B.T.A. decision, March 8, 1939.
[45] *Sparkman v. Commissioner*, 112 F. (2d) 774 (C.C.A. 9th, 1940).
[46] *Bourne v. Commissioner*, 23 B.T.A. 1288 (1931), aff'd, 62 F. (2d) 648 (C.C.A. 4th, 1933), certiorari denied, 290 U.S. 650 (1933).

Recognizing the reality of this situation, and its impact at the present high tax rates, Congress has undertaken to meet it by a new provision in the Revenue Act of 1942.[47] This allows the deduction of what may be called extraordinary medical expenses. Specifically, it is a deduction for that part of the expenses of medical care which exceeds 5 per cent of the taxpayer's net income. Anything less than 5 per cent is treated as an ordinary personal expense, but medical expenses larger than that are deductible. There is, however, a top limit on the amount which may be deducted of $2,500 for a married couple or the head of a family, and $1,250 for a single person. "Medical care" is defined for this purpose as including "amounts paid for the diagnosis, cure, mitigation, treatment, or prevention of disease, or for the purpose of affecting any structure or function of the body."

This deduction should be of real benefit to many persons who are confronted with heavy medical expenses. There will doubtless be attempts to abuse it by persons who seek to deduct the costs of their annual vacations in Florida on the ground that their health requires it or that their doctor has ordered it. But most of the claims will be legitimate, and the relief afforded will be a real contribution to the problem of the costs of medical care.

Procedure

Income tax returns are due the fifteenth day of the third month after the close of the taxable year. Most individuals make their returns on the basis of a calendar year, and their returns are thus due on March 15. But returns can be made on the basis of a fiscal year ending on the last day of any month,[48] and in some cases it is desirable to use a fiscal year. The return must be filed with the Collector of Internal Revenue for the district in which the taxpayer resides or has his principal place of business. Formerly the return had to be made under oath, but this was changed by the Revenue Act of 1942, and they may now be filed with a simple signature under the statement printed on the return form that the signing is made under the penalties of perjury.[49] The tax may be paid in full at the time the return is filed, or it may be paid in quarterly installments, the first paid with the return, and the rest at three month intervals thereafter.[50]

In addition to the return of taxable income, each person must file an information return disclosing the amount and payee of all payments made in the amount of $500 or more in any taxable year.[51] (In the case of payments

[47] Sec. 23(x) of the Code, added by § 127(a) of the Revenue Act of 1942.

[48] Sec. 48 of the Code. But the taxpayer cannot change from one accounting period to another without the approval of the Commissioner of Internal Revenue. Secs. 46 and 47 of the Code.

[49] Sec. 51 of the Code.

[50] A discount for advance payment may in effect be obtained through the purchase of Treasury Tax Savings Notes. These may be bought at any time, by reserving a portion of current earnings, for instance, and may then be used for the payment of subsequent income tax. They return interest of 16 cents a month on each $100, or 1.92 per cent a year, on amounts up to $5,000 a year. They may be purchased direct from any Federal Reserve Bank, or through the taxpayer's own local bank.

[51] Sec. 147 of the Code.

made to employees from which Victory tax has been withheld, the receipt furnished to the employee takes the place of the information return.) Information returns must be filed with the Commissioner of Internal Revenue in Washington, and are due by February 15 of each year. Patients and others making payments to physicians of amounts of $500 or more in any calendar year are likewise required to file information returns,[52] so that the Government has a record of any such items in a medical man's income. This may be some incentive against carelessness in making out a tax return.

Once the tax return has been filed, it is checked and examined by the revenue authorities. In many cases it is accepted as correct and nothing more is heard of it by the taxpayer. In other cases, however, there are two possibilities. The taxpayer may have paid too much, or the Government may think that he has paid too little. If the taxpayer thinks that he has paid too much, either because he has included something in income which was not properly taxable as income, or because he has not taken a deduction to which he was entitled, he may file a Claim for Refund with his local Collector of Internal Revenue. This Claim must be on a blank known as Form 843, obtainable from any Collector's office, and it must state the grounds on which the Claim is based. The Claim cannot be considered unless it is filed within three years from the due date of the return (or within two years after the tax was paid, in case the payment was delayed for some reason).[53] After the Claim is filed, it will be considered by the revenue authorities, and may be allowed. If it is allowed, the overpayment of tax is refunded with interest at the rate of 6 per cent. If it is denied, then the taxpayer's only alternative (unless he can get a reconsideration of the claim, and that is unlikely) is to bring suit in the appropriate court. The suit must be brought within two years from the date of denial of the claim.[54] It may also be brought at any time more than six months after the time of filing the claim, even though the Commissioner has not acted on it.

Probably the more frequent event is that the revenue officers have some question about the return. In that event, they usually write to the taxpayer and ask him to come in with such records as he may have. In many cases a simple interview is all that is required. There may be some ambiguity on the return which is easily and satisfactorily explained, or the revenue officer may be seeking substantiation of some item claimed as a deduction. If the explanations are not satisfactory to the revenue officer, however, he writes another letter to the taxpayer in which he says that he proposes to find that there is a deficiency in the tax payment, and the taxpayer is given formal opportunity to protest this finding if he feels that he has reason to do so, and so desires. If the matter is not then satisfactorily

[52] Sec. 19.147–1 of Regulations 103: ". . . Fees for professional service paid to attorneys, physicians, and members of other professions come within the meaning of the term 'fixed or determinable income' [in § 147 of the Code] and are required to be reported in returns of information as required by this section."

[53] Sec. 322 of the Code.

[54] Sec. 3772(a)(2) of the Code.

adjusted, the Commissioner's staff sends the taxpayer a formal determination of a deficiency.[55] The taxpayer may then either pay the tax determined, or within 90 days he may file a petition with the Tax Court of the United States seeking a redetermination of the Commissioner's ruling. From the decision of the Tax Court, either side may appeal to the higher Federal courts.

Whenever it is finally determined that the taxpayer owes an additional tax, the Collector's remedies for collection are very powerful and summary. He does not need to obtain any process from a court. After giving 10 days' notice, he has authority to distrain (that is, to seize) any property of the taxpayer, including bank accounts and any other assets,[56] and with the most meager and antiquated exemptions.[57] It should also be pointed out that any deficiencies in tax must be paid with interest at the rate of 6 per cent.

Penalties

Civil Penalties. The tax laws work fairly smoothly when they are fully and fairly complied with. But they contain rather harsh provisions which come into operation when there is serious default in meeting the obligations of the statute. The mildest of these take the form of civil penalties which can be asserted and collected in the regular proceeding for the collection of the tax. The first of these is applicable to the failure to file a return on time. If the return is not filed when it is due, a penalty may be assessed of 5 per cent for each 30 days (or portion of 30 days) that the return is late, up to a maximum penalty of 25 per cent.[58] Even though a return is properly filed, a penalty of 5 per cent may be collected where there is a deficiency in the tax shown due on the return, and any part of the deficiency "is due to negligence, or intentional disregard of rules and regulations but without intent to defraud." [59] The major penalty, however, is the 50 per cent fraud penalty. This is due "If any part of any deficiency is due to fraud with intent to evade tax." [60] With tax rates where they are now, this penalty may impose a very severe burden. In one leading case,[61] the Supreme Court sustained a fraud penalty in the amount of $364,354.92 determined against a taxpayer,

[55] In the ordinary case, this notice must be sent within three years from the due date of the return. But if there is an omission of items amounting to 25 per cent of the gross income, then the notice may be sent within five years. And if the return is false and fraudulent, there is no time limitation on the determination and collection of the tax. Secs. 275 and 276 of the Code.

[56] Sec. 3690 of the Code.

[57] The exemptions allowed by § 3691(a) include arms for personal use, one cow, two hogs, five sheep and wool thereof, household furniture to an amount of $300, and the "books, tools, or implements of a trade or profession, to an amount not greater than $100."

[58] Sec. 291(a) of the Code. The Commissioner has power to relieve against this penalty where "it is shown that such failure is due to reasonable cause and is not due to willful neglect." This takes care of the situation where the failure to file the return is due to the taxpayer's illness or other disability. The penalty is of course not due where the failure to file return is during a period of military service or while the taxpayer is "outside the Americas," as indicated in notes 40 and 41 above.

[59] Sec. 293(a) of the Code.

[60] Sec. 293(b) of the Code.

[61] *Helvering v. Mitchell,* 303 U. S. 391 (1938).

although the taxpayer had previously been acquitted by a jury of the criminal charge of filing a false return.

Criminal Prosecutions. In addition to the civil penalties, the Government may also proceed by way of criminal prosecution. Any person who willfully fails to pay a tax, file a return, keep proper records, or supply information may be found guilty of a misdemeanor, and subjected to a fine up to $10,000 and imprisonment for not more than one year.[62] The penalty may be even more serious when a person "willfully attempts in any manner to evade or defeat any tax." [63] That is a felony, and may be punished by a fine of $10,000 and imprisonment up to five years. Similarly, any person "who willfully makes and subscribes a return which he does not believe to be true as to every material matter" is guilty of a felony and may be subjected to the penalties prescribed for the crime of perjury.[64]

These provisions have been the downfall of many characters of notoriety.[65] They have also been applied a good many times in the cases of less prominent personalities, enough times to show the wisdom of playing square with the tax collector, even if a man cannot say with Justice Holmes that he likes to pay taxes. The Justice said that he liked to pay taxes, because that was the way he bought civilization, and there has never been a time when that was more true than now. The opinion has been held by some that tax evasion is not unknown in the medical profession, because it may be thought to be easier to get away with there than in some other fields of activity. Doctors usually receive their fees from many persons in relatively small amounts, and if a doctor is not honest, he may think that he can keep two sets of books, and return only part of the checks as income, or he may omit to return some or all of the cash fees that he receives, figuring that there will be no way to check up on them.

Admittedly, such action can impose a difficult problem on the tax collecting officers. However, it has been solved, more than once, and an example may prove of interest. In the case of *Wiggins v. United States,*[66] the defendant was a dental surgeon who had filed returns for two years showing income of $18,000 and $20,000, when in fact his income was over $30,000 for each year. It appeared that the defendant had kept two sets of books, one a secret "true book," and another "false book." Only a portion of the fees was included in the latter, and only this portion was returned. The Government learned about this through anonymous telephone calls which turned out to come from the defendant's nurse and secretary who had had charge of his office and books for several years. The defendant put his

[62] Sec. 145(a) of the Code. See *Spies v. United States,* decided by the Supreme Court on January 11, 1943, where it was held that a willful failure to file a return, without more, must be prosecuted as a misdemeanor under this clause, and not as a felony under § 145(b), referred to below.

[63] Sec. 145(b) of the Code.

[64] Sec. 145(c) of the Code.

[65] See for example the case of *Capone v. United States,* 51 F.(2d) 609 (C.C.A. 7th, 1931), certiorari denied, 284 U.S. 669 (1931).

[66] 64 F.(2d) 950 (C.C.A. 9th, 1933), certiorari denied, 290 U.S. 657 (1933).

trust in her, and eventually she turned him in. He received a substantial prison sentence.

Estate and Gift Taxes

Brief mention may be made of the estate and gift tax provisions, for any doctor may at least hope to become subject to these taxes. The federal estate tax now allows an exemption of $60,000, but all property in excess of this is subject to fairly high and rapidly graduated rates of tax. The tax is imposed on the net estate, and as in the income tax, the net estate is determined by defining a gross estate against which certain deductions are allowed. The gross estate includes all the property which the decedent owns when he dies, including any dower or marital interest which his wife may take in his property. It also includes any property which he may have transferred during his life time, either in contemplation of his death, or where he has reserved a power or other interest in it. The amount of life insurance payable by reason of death is included in full in the gross estate where the decedent either paid the premiums or retained incidents of ownership in the policy, such as the right to borrow, or take the surrender value, or change the beneficiary.[67] The entire value of property held jointly by the decedent and his wife is also included, if the property came originally from the decedent himself.

Against this property included in the gross estate, there is allowed the exemption of $60,000 and two principal deductions. All debts, including funeral and administration expenses, and the expenses of the last illness, may be deducted,[68] and a full deduction is likewise allowed for all gifts and bequests to charity. The only other deduction is of property which has previously been subjected to the estate tax within five years. The estate tax is in effect a periodic property levy, and the Government says that it should not be imposed oftener than once in five years.

Parallel with the estate tax is the gift tax. This applies to all gifts made while the taxpayer is living. There are two exemptions, one of $30,000, and the other which allows a gift of $3,000 each to be made to any persons every year. In this way, a taxpayer can over a period of time give away a

[67] If the doctor's wife has independent means, estate tax may be saved under the law as it stands at present if she takes out the insurance on his life and pays all the premiums and takes all the incidents of ownership in the policy with no rights given to him in any event. In such a case, the proceeds payable on his death will not be taxable in his estate, nor will they be taxable as income to the wife. If the wife should die first, however, the value of the policy would be an asset of her estate and subject to tax there if her estate exceeded the allowable exemptions and deductions. The premium payments must be paid wholly from the wife's own separate property. It will not do for the husband to give the wife the money to pay the premiums, for then they would be paid "indirectly" by him. It is probably sufficient, however, if the husband gives the wife property freely and with no strings attached, and she then uses the income from the property to pay the insurance premiums. This is most likely to be true when the gift to the wife is made wholly independently of any plan to use the income to pay insurance premiums.

[68] This includes the reasonable charges of a physician who may have attended the decedent. The bill for such services is a "claim against the estate" of the decedent and is thus deductible. See *Lucius N. Littauer*, 25 B.T.A. 21, 28 (1931).

substantial amount of property without incurring the gift tax. If his gifts exceed these exemptions, then the tax applies. It is imposed at graduated rates on the taxable gifts made since the gift tax went into effect in 1932. The rates are in general about three-fourths of those under the estate tax. There is thus a substantial inducement to make gifts in the case of wealthy persons, and this inducement has been rather freely accepted by many persons. There are others, however, who do not have to concern themselves very greatly with the gift tax. But the gift tax exemptions and the estate tax exemptions are steadily moving lower and lower, and these taxes may soon follow the income tax in being made applicable to a much larger group of taxpayers.

TRAUMATIC PSYCHOSES *

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Introduction

In this section will be discussed only the forensic problems pertinent to the psychoses due to direct head injury. In the official classification of the American Psychiatric Association these are known as: (1) Traumatic delirium, (2) posttraumatic personality disorder (new diagnosis) or traumatic constitution (old diagnosis), and (3) posttraumatic mental deterioration (dementia).[10, 30, 41, 46, 66, 67] These designations do not describe sharply defined entities, but only variable symptom-complexes with overlapping boundaries. The numerous relationships of head injury to other psychoses [1] and neuroses [2] will be presented in other sections of this book. The senior author

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[1] Psychoses are major personality disorganizations characterized by poor contact with or appreciation of reality, disturbed ethical and social relations, decreased ability in most cases to pursue a gainful occupation or maintain stable relationships, which may or may not be accompanied by signs of organic brain disease, defects of the intellectual functions, emotional deterioration or accessory symptoms such as hallucinations or delusions. The concept of psychosis is primarily of legal rather than of medical importance and usually carries with it both denotation and connotations of incompetence at law. Examples are schizophrenia, manic-depressive psychosis, psychosis with brain tumor, psychosis with mental deficiency, psychosis with cerebral arteriosclerosis, psychosis with epileptic deterioration or epileptic clouded states, psychoses with psychopathic personality. Many individuals with a mild grade of these disorders may escape adjudication if they do not attract legal or medical attention.

[2] Neuroses are "minor" personality maladaptations, which may be severe but do not disrupt the individual's relations with reality (temporal, spatial, social, economic, ethical) sufficiently to cause him to be adjudged insane at law. The neuroses are types of adaptation and defense against inner conflicts, often largely unconscious, which have their origins in childhood, and are modified by subsequent experiences so that their natural history is the unique and individual biography of the person afflicted. They may be regarded as energy systems operating analogously to the simpler systems in physics. Here also are found indestructibility of energy, action and reactions in equivalent amounts, and the tendency of every energy system to seek an equilibrium (Second Law of Thermodynamics). Instinctual forces repressed by social training cause internal stresses which express themselves variously: somatically, psychologically, socially. (A) *Somatically* neuroses may cause such disorders of the gastrointestinal system as vomiting, constipation, diarrhea and "colitis," bowel distress, belching, flatus, starvation (anorexia), over-eating, peptic ulcer; disorders of the cardiovascular system such as palpitation, tachycardia (fast pulse rate), pain in the chest, high blood pressure, suffocation, choking or labored breathing with attacks of acute anxiety, paleness, fainting, perspiration; disorders of the respiratory system such as some types of bronchial asthma, and difficult and irregular respiration both as to rate and depth; disorders of the skin with various types of wheals and eczemas. Gross motor disturbances also occur as tremors, twitching (tics), paralysis of the hands, arms, legs, vocal cords, neck muscles, occupational cramps, lump in the throat (globus). Sensory disorders may be partial or total anesthesias which fail to conform to anatomic patterns but do correspond to glove or stocking type of distribution. The genito-urinary system may be affected by the neurosis in such a way as to manifest backache, impotence or premature ejaculation, amenorrhea, dysmenorrhea, urinary frequency or urgency, pain or discomfort in the pelvic region.

(Franklin G. Ebaugh) has previously discussed them in another publication [18] (See Chart A).

The growing interest in these psychoses is reflected in increased publication because of increasing economic value, greater prevalence, and better diagnosis. As an example of greater prevalence than is commonly known, we cite the fact that although less than 1 per cent of state hospital admissions are diagnosed as traumatic psychoses, yet Allen, Moore, and Daly [3] found the surprising number of 245 (7.9 per cent) cases of subdural hematoma [3] out of 3100 consecutive autopsies on psychotic patients.

Since more traumatic psychoses are being detected, inevitably the legal burden associated with most of them is increased. It is therefore worthwhile to present the better current psychological means of diagnosis, together with the possibilities for future improvement which will be of genuine aid to patient, attorney and physician. Until recently we were almost totally dependent upon physical means (skull roentgenograms, encephalograms,[4] ventriculograms,[5] subdural pneumograms,[6] electroencephalograms,[7] spinal fluid studies,[8] and exploratory surgery) [49, 61, 68a, 68b] to supplement the clinical ex-

Headaches of many types, dizziness, nausea, blurring of vision, ringing of the ears, weakness, fainting, lack of ability to tolerate heat, exposure, exercise or alcohol may all be caused by neurosis; as these same symptoms are frequently found in traumatic psychoses the problem of differentiation may be difficult unless physical findings, the life history, or special psychological tests aid materially in the diagnosis. (B) Psychologically neuroses may manifest themselves in a multiformity of anxieties, projections, fears (phobias), obsessions, tensions, preoccupations, unusual marked interests, inhibitions of thinking, lapses of memory. (C) Socially neuroses manifest themselves in more or less frank patterns of sadomasochistic behavior, exhibitionism in more or less sublimated form, marked penury, avariciousness, meticulousness, irresponsibility, hostility, passivity, or pathological generosity, litigiousness, dependency, aggressiveness. Alcoholism, perversions, vagrancy, and other similar behavior patterns may be methods of defense against the anxiety caused by repressed conflicts.

[3] A bloodclot beneath the tough outer casing of the brain next to the skull.

[4] A roentgenogram of the skull made after the injection of air or gas into the spinal canal thus revealing some of the inner architecture of the brain. Distortions and abnormalities seen on these roentgenograms make possible better diagnoses of pathological conditions.

[5] A roentgenogram of the skull made after the injection of air or gas directly in the drainage system (ventricles) of the inner brain through a small burr hole in the skull.

[6] Injection of air under the dura (the tough outer casing of the brain).

[7] An electroencephalogram is a graphic record on a paper strip resembling stockbroker's tape which records the "brain waves" from several areas of the skull. No operation required. It may reveal the presence of a bloodclot, tumor, or abscess in the brain. It is also useful for detection of convulsive states (epilepsy).

[8] Spinal fluid studies usually include investigation of the cell count, the presence of globulin, the total quantity of protein, the Wassermann or Kahn reaction for syphilis, and the Lange colloidal gold sol reaction for detection of neurosyphilis or other disease of the brain. While drawing the spinal fluid from a needle inserted into the spinal canal between the third and fourth lumbar vertebrae, the fluid pressure is carefully measured by a water or mercury manometer. Pressures above 150 mm. of water (12 mm. Hg), a cell count over 8–10, the presence of globulin, total protein values above 40 mg. per 100 c.c. are to be regarded as suspicious of an organic disease of the brain. Standard laboratory texts should be consulted for interpretation of these findings, for the normal range is often wide and marked increase must be noted before the findings can be used as conclusive evidence. The presence of blood in the spinal fluid after an injury is presumptive evidence of injury to the brain, in fact, more probable evidence than the visualization on a roentgenogram of a small linear fracture, hence it is desirable that all patients have one soon after the injury provided there are no medical contraindications. Positive spinal fluid findings six or more months after an injury are usually accepted as evidence of gross damage to the cortex, whatever the cause may be.

aminations, for the psychological tests of the mental status were not sufficiently developed to be generally useful in a court-room. The test methods presented here are believed to be the best available for the psychological study of the traumatic psychosis. By their means organic "deterioration" or "incompetence" can often be demonstrated when ordinary lay observation or physical means fail. They meet the challenge that "the frontal lobes are silent" for they provide means to listen if one is willing to pay the price.

If specific tests designed for testing limited functions are utilized by experts, damage can be demonstrated long after the clinical picture is one of apparently good recovery.[11] We are on the threshold of new methods for studying and appraising alleged "traumatic psychosis," and it is one of the purposes of this paper to present the types of examinations which courts may well expect competent psychiatrists to make in this group of cases before bearing witness in court.

I. Psychoses Due to Head Injury

A. Traumatic Delirium:

1. *Symptomatology.* Traumatic delirium is usually characterized by a disordered sensorium (defective attention and awareness, impaired reception and synthesis of sensory impressions, often giving rise to misinterpretations especially in the auditory and visual spheres); a generalized haziness or confusion; motor restlessness,[9] perhaps with excitement and wandering, and lack of motor control; defective immediate and remote memory; the loss of social, temporal and spatial orientation, including a phasic periodic failure to recognize even common or familiar places and persons; a tendency to spontaneous verbal productions, often expressing imaginative figments, which may or may not be coherent.[6, 10, 27, 46, 66, 67, 72] Hallucinations, usually visual, are not uncommon. The pervading affect is usually tinged with apprehensiveness or fear. Among the character traits one or more of which may appear prominently, are belligerence, aggressiveness, demandingness, depression, passivity, suspiciousness. Irritability and uncoöperativeness are quite common.

2. *Prognosis and Legal Implications.* A delirium is to be regarded as of the same degree of seriousness as a pronounced skull fracture or a prolonged coma,[10] for the underlying causes are the same (concussion,[11] contusion,[12] laceration,[13] hemorrhage and increased intracranial pressure). The terminal behavior disorder resulting from these lesions may be more widespread than is usually accepted.[1, 2, 3, 9b, 26, 28, 41, 58, 60, 62, 64, 66, 77] These healing processes may be relatively unattended by pain, dizziness, unsteadiness, syncope [14] or convulsions yet be sufficiently extensive to alter the cere-

[9] Irregular movements, usually aimless, of the arms, legs, or body.
[10] A coma is a state of profound insensibility.
[11] A concussion is a state of unconsciousness caused by mechanical displacement of brain tissue usually associated with direct local injury and tears.
[12] A contusion is a bruise or disorganization of tissue usually accompanied by bleeding.
[13] A laceration is a tear or break in the continuity of the tissue structure.
[14] Syncope: fainting.

bral functions in the same manner as other lesions causing loss of cerebral tissue. It is possible that the phagocytic [15] cells may attack "uninjured brain tissue".[46] Of more than passing interest is the belief that the disturbed circulation and hence the nutrition and metabolism may be important factors in the recovery from head injury.[28, 52, 54] Powell [52] cites evidence that poor nutrition, prolonged hypotension [16] and prolonged increased intracranial pressure may be operative in many diseases.

(*a*) Relation of duration to prognosis. The prognostic signs may be of legal significance since they are quoted in order to establish the probable severity and outcome of a case. The presence or absence of a fracture is of little prognostic or diagnostic aid if there is no depressed fracture causing direct mechanical compression.[55] Severe concussions without evidence of skull fracture cause deterioration as frequently as those with skull fracture [17].[62] Deliria of mild grade and under 24 hours' duration are usually followed by fairly good recovery, but the rule is far from invariable. Deliria of more than one week's duration suggest more profound damage and final estimates of the residual symptoms and destruction should not be made for at least six months when the re-organization of the brain tissue is stabilized. Delirium or unconsciousness of more than one month's duration almost certainly represents severe tissue destruction which requires a guarded prognosis. Final estimates should await stabilization, which may not occur for six to eighteen months. Some clinical judgment is necessary before permitting a patient to be examined psychologically for legal compensation purposes. The greatest damage will be apparent during the early months of convalescence before the powerful compensatory trends are fully established. A standard practice will probably be established regarding the optimal time for psychological testing as these methods are utilized more generally.

In the young recuperation is better, for traumatic psychosis will almost certainly not occur.[19, 62] The presence of paranoid trends,[18] persistence of symptoms for two years, or advancing age are prognostically unfavorable. It should be remembered that the prognosis may well be dependent upon the therapy in some cases for the best physiologic and psychiatric care may prevent many unfortunate sequelae.

The clinical courses of deliria vary widely, some of them persisting for several weeks. The latter often resemble the well known Korsakoff syn-

[15] The "white" or scavenger cells of the blood or special cells in the brain which are mobilized in the presence of injured tissue.

[16] Low blood pressure.

[17] A fracture is a dissolution of the continuity of bone. When the bony fragments press directly against the brain it is called a depressed fracture.

[18] Paranoid trends usually refer to ideas or delusions of persecution. They may be expansive in character and then the patient may believe himself to possess unusual strength, special, often magical, abilities, or unusual powers (he becomes "an inventor," "Christ," "Napoleon".) Egocentricity, suspiciousness, and the propensity for placing blame on others together with seeing special "significance" or drawing inferences in otherwise neutral events distinguishes the paranoid character. Intelligent paranoid characters are notoriously excellent litigants, for their personality augments any native abilities in this direction. Naturally, with deterioration and loss of ethical considerations these litigious trends increase and are difficult to separate from legitimate demands.

drome [19] (not to be confused with the "alcoholic" Korsakoff symptom-complex due to vitamin B_1 (thiamine) deficiency). Here are seen fabrications having more or less basis in fact, confabulations wherein the patient fills in gaps in memory, especially on direct questioning, with imaginary occurrences, usually in a fairly coherent form and with the appearance of verisimilitude. Unconscious trends may be apparent in these fictions which may be useful to the therapist in the convalescent period.

(*b*) Forensic implications of phasic deliria. Occasionally the phasic character of a delirium becomes a major forensic problem, especially where disposition of property is concerned. A will or money settlement made by a patient during a so-called "lucid interval" may seem to many to be an accurate expression of the patient's desires, but from what has been said about the basic pathology it is apparent that the fluctuation between "clearness" and "confusion" of the sensorium causes these terms to be only relative. It seems certain that the tissue functions are severely disturbed if there are detectable signs of either neurological or psychological dysfunction. Although the effects of the injury may be reversible with rest and healing, the physiological homeostasis [20] during the delirium is unsettled, and until a healthy balance is reëstablished many psychological functions are impaired or entirely unavailable. The patient cannot be said to be of "sound mind and sound body" when the integrity of the central nervous system is physiologically disrupted in a demonstrable manner, nor can it be said that the injured patient is at such time able to give due weight and consideration to all factors after mature reflection.

This principle that the constancy of underlying etiology shall determine the fact of competence was apparently recognized by the United States Supreme Court when it decided that the jury should consider evidence that the defendant was intoxicated at the time of the crime in the case of Hopt vs. People (104 U. S. 631). The incapacities caused by the toxic effects of alcohol are analogous to those caused by a head injury.

To lay observers it is a shock to see demonstrated the many defects of the sensorium of a patient that had seemed to them to be lucid. The persistent continuity of the underlying physiological disturbance must be understood in order to avoid the error of assuming a patient's competence upon superficial examination. Halstead [24b] cites the instance where intelligent business men, misled by an occasional thread of lucidity, repeatedly consulted a patient in a post-operative toxic delirium following removal of a left prefrontal lobe tumor, on matters involving many thousands of dollars, when the patient was really confused, incontinent and seriously disoriented for time, place and person. Only careful psychological examination can determine the relative integrity of the cerebral organization under these circumstances.

[19] A syndrome is a group of symptoms occurring together.
[20] Homeostasis is a state of optimal equilibrium.

Example of delirium with gradual recovery: The patient is a 28-year-old single white male pharmacist. On November 28, 1942 the patient was thrown from his car as it failed to take a turn. He struck the pavement on the right side of his body, sustaining a fractured scapula, fractured ribs, and mild lacerations of the right frontal region of the skull. The patient was hospitalized in a short time, went into mild shock, but responded in several hours to the usual treatment. He remained unconscious for seven days. He was incontinent, restless, and from the first it was apparent that he moved the left arm and leg more than the right. He became aware of his surroundings very slowly. On making purposeful movements, it was evident that he had a right-sided hemiparesis with involvement of the third and seventh cranial nerves on the right. The spinal fluid was grossly bloody. The temperature rose to 102°, and after two weeks returned to normal, under management with codeine, paraldehyde, fluids and magnesium sulphate by nasal tube. Cheyne-Stokes respiration was present from the third to the fifth day following the injury. From the seventh to the twenty-eighth day following injury the patient's confusion and disorientation gradually cleared. He became more cognizant of his surroundings; his movements became better integrated; memory for events preceding the accident improved, but he was amnesic for a period of at least a month following the accident. Six weeks after the injury the patient's sensorium was clear except for occasional evidences of mild confusion. Recovery now uneventful with no residual symptoms. Impression: Cerebral contusion; subarachnoid hemorrhage; traumatic delirium; hemiparesis, right.

3. *Differential Diagnosis.* A diagnostic problem of major legal importance is the differentiation between an organic delirium, hysterical symptoms in a "panic state," "hysterical delirium," [21] and frank malingering for compensation. The events leading up to an accident may be so frightening that the patient, although suffering little or no head injury, may be overcome by a "panic state," i.e. confusion due to extreme fear (see "traumatic neurosis"), which superficially resembles a delirium but is usually identifiable after close observation and response to therapy by an impartial specialist. More difficult is the recognition of a thorough-going "hysterical delirium" sometimes closely resembling one of toxic-organic origin, but differing from it in its susceptibility to resolution by such methods as reassurance with or without sedation, hypnosis, sodium amytal, interviews or physical shock. Outright malingering without a hysterical component is probably uncommon, and can be detected by a specialist in the course of a routine examination of the sensorium because the behavior is not appropriate to the situation. In one way or another the malingerer will overplay or underplay his act if the physician can take the time to give him an adequate stage on which to reveal himself.

Uremia as a complication of head injuries without damage to any other part of the body has not been generally recognized, but Cumings [12] of London in an investigation (1940–42) upon air raid casualties found chemical blood studies and autopsy proof that renal damage existed in some cases of head injury. The mechanism causing uremia following head injury or the

[21] An hysterical delirium is a delirium (see definition under "Traumatic Delirium") due to hysteria.

renal lesions following traumatic anuria is unknown. Since uremia is often attended by confusion, disorientation or other signs of psychiatric nature it is important that this condition be looked for in order to institute proper treatment.

Another unusual condition which should be ruled out is acute pulmonary edema which may occur following injury and be accompanied by psychiatric symptoms. Weber and Blum [70] describe a man of 40 with a "screaming coma" who developed an acute pulmonary edema.

A standard but difficult problem in diagnosis is the evaluation of the alleged damage caused by a head injury in a patient who can be shown to have been suffering from hypomania before his accident, and who claims that his posttraumatic state is due solely to the accident. The standard articles by Ebaugh and Benjamin,[13] Strauss and Savitsky,[66] Bowman and Blau [8] and I. S. Wechsler [72] are valuable references on this subject as well as on the question of traumatic precipitation of psychosis.

Example of Ma. Fo. The patient is a 56-year-old professional man who acquired an enviable prominence in his community by his energy and ability. He was restless, driving, "temperamental," with rapidly fluctuating moods throughout his life including several periods of depression. He suffered a head injury in 1938 from a diving accident without apparent sequelae. In February, 1942 he was forced to undertake new duties which made him obviously irritable, tense, distractible and uncooperative. Hypomania of mild degree was diagnosed in August, 1942 by a physician but the patient went on working. In November, 1942 he drove off the road in order to avoid a collision and was only, apparently, momentarily stunned. He claimed at first to be physically unhurt and there was no physical evidence of injury, but he did feel "shocked" and later ascribed his increased hyperactivity, increased pressure of speech, confusion and partial disorientation to the effects of the accident. He entered the hospital in a restless, disheveled state with circumstantial speech, flight of ideas, distractibility, preoccupation and short periods of confusion. Recovery occurred gradually with no evidence on various tests of any genuine cortical damage. It was held that he had no basis for a claim because of the previous personality history and absence of data to prove that a head injury had been sustained.

A complete amnesia [22] for events following a head injury (anterograde type) is uncommon after the period of coma, stupor or delirium. Retrograde amnesia, i.e. that one screening the period before the accident, is more common than the anterograde, usually obscures only a short period before the accident, and is more diffuse and less complete than an hysterical amnesia: The latter may be so complete that the identity of the person is lost. Fiction writers have exploited this device so much that many persons assume that such loss of personal identity after head injury is common, whereas clinically complete amnesia, i.e. loss of memory for most of the facts of the patient's past life without aphasia,[23] actually occurs more characteristically in hysterical individuals who want to escape an undesirable life situation. Likewise, complete failure to recall the events before an accident occurs more fre-

[22] Amnesia is memory loss.

[23] "Aphasia is the total or partial loss of the use or understanding of language, the vocal cords remaining intact." (Merriam Webster, 1933.)

quently in persons with an hysterical personality who gain something by the amnesia. One example is that of a university student who became completely amnesic after an accident in which his fiancee was killed but whose memory was restored by hypnosis.[24] It seems that he was ashamed to admit that they were parked on a railroad track and the consequent shock and guilt motivated an obliteration of the painful event.

4. *Factors Influencing Recovery.* Although a prolonged delirium of many weeks' duration augurs poorly for restitution without damage, some patients make a splendid recovery because of their previously excellent character organization. In general, the form and content of the psychosis depends upon the personality of the individual patient.[17a] Recovery certainly depends as much or more upon the strength and assets of the character than upon the relative severity of the injury.[13, 66, 72] Of two men, each having approximately the same order of head injury, the one with the better integration will make much the better recovery. The fact that patients with apparently only a mild intellectual deterioration really have extensive cerebral damage suggests powerful psychological compensatory capacities. These capacities for regaining apparent normality furnish the basis for therapeutic optimism and the rationale for research methods to improve our knowledge of treating them. The prognosis then depends upon three factors: (1) the severity of the injury, including the site of injury and the amount of tissue damaged together with secondary physiological changes (shock, pressure, hemorrhage, nutrition); (2) the relative strength and viability[25] of the character organization; (3) the treatment regime which utilizes to the full the capacities which remain functional, increasing the field for the compensatory processes to act, teaching technics to improve common integrations, encouraging such latent creativities as may be substituted for the losses.

Summary, Section I

A traumatic delirium is caused by tissue displacement or injury and characterized by many disturbances of the sensorium. These are best detected by psychological methods, when physical signs are absent. Although the delirium may appear to alternate with "lucid" states, it is often possible to show that important basic psychological functions remain impaired, so that it is important that no legal commitments be made until physiological stability is assured. The prognosis for ultimate recovery varies with the duration of this delirium, if all other factors are equal. Deliria of more than one month's duration seldom recover without patent residual damage. An outstanding factor for estimating potentiality for recovery is stability of the pre-traumatic character organization.

[24] Hypnosis is the induction of a state of narrowed consciousness, in which the subject is hypersuggestible to the hypnotist.

[25] Viability is the capacity to maintain integrity and resist dissolution.

B. TRAUMATIC CONSTITUTION OR POSTTRAUMATIC PERSONALITY DISORDER:

1. *Symptomatology.* The name "traumatic constitution" or posttraumatic personality disorder is given to a variable symptom-complex to describe the poorly demarcated intermediate zone between head injuries recovering without apparent disability and the "posttraumatic mental deterioration." [27, 30, 41, 46, 58, 66, 67, 72, 77] The word constitution here refers to the psychological structure and not to the genetically determined physical structure of the patient. Usually this diagnosis is applied to fairly obvious changes in personality or character, some of which are accepted as being "caused" by head injury, together with newly acquired subjective symptoms, which may or may not be related to the head injury. Some months after an accident, perhaps on returning to the ordinary exertion of work, the patient and his associates notice that his energy level and work output are markedly lower, with serious decline of his attention, memory, and ability to sustain concentration on projects. These intellectual disorders and the important mood disturbances, to be described later, are often complicated by more or less severe headaches, usually unlocalized, or a sense of pressure in the head. Severe headaches are extremely painful and often of long duration. They are accentuated in degree and prolonged in duration by any exertion, excitement, or sensory stimulation, especially loud noises, bright lights, or heat. These patients are less tolerant of alcohol, heat, exertion, sunlight; some few drink to escape their pain. Dizziness, usually aggravated by sudden change of position, is another common symptom. Convulsions occur if the motor cortex [26] is involved by scar formation, hemorrhage or pressure. Many types of character disorder are revealed, probably in susceptible individuals; of these, panic and rage and various hysterical states are the most common. These complaints have no apparent relation to the presence or absence of skull fracture or delirium. The sooner they occur after the accident the more probable is an etiological relationship; little credence is earned if they occur more than two years after the injury.

As the condition grows there becomes apparent gross retardation and impoverishment of thinking and speaking. Ideas, especially of the more abstract variety, are handled with less dexterity, fullness and speed, if handled at all. There is constriction of the psychological fields of interest, both immediate and remote, with little or no spontaneity, gayety, originality or invention. Clinging to the comparative security of the concrete facts of everyday living, avoiding the unknown or changing conditions, adhering to the familiar and safe, there is made, apparently, a consistent effort to reach a safe, though dull, equilibrium. When this monotonous security is broken, the response may take the forms of restless anxiety, irritability, nagging,

[26] The motor cortex is the third frontal convolution of the brain, just in front of the central fissure. All voluntary muscular activity results from impulses discharging from this area.

fault-finding, all in an effort to reëstablish the cherished state of freedom from painful stimulation. If the stimulus is too painful or threatening to be controlled the result is the well-known fit of temper, a violent outburst combining rage, aggression and motor excitement. These "catastrophic reactions" [20d] usually subside fairly quickly if the patient is permitted to sink back into his haven of seeming vacuity. Many patients avoid the anxiety of anticipation of the unexpected by keeping busy at many little familiar tasks.[55] Naturally such a patient will seem egotistical, self-centered, willful and selfish. Because so much of his energy must be diverted to avoid anxiety and pain, he has little energy left for free play of interest in, or love for his family, friends, business, hobbies. This fight against being hurt may well accentuate any tendencies to depression he may have, showing themselves in morose weeping, brooding self-pity, acrimonious guilt and recrimination. More and more he will learn to avoid exposure to unthinking persons who inadvertently strain his tolerance, or unwittingly force him to make gigantic efforts to retain his composure, that fine balance of emotional-intellectual forces which enables him to deal effectively with reality. If his social isolation becomes uncomfortable he may develop paranoid beliefs about those around him, as absolute strangers in a foreign land or partially deaf people are known to do. Others overcompensate for their inner weakness and insecurity by developing obnoxious aggressiveness, whereas the immature may regress quickly to infantile dependency, cleverly adapting technics to gain attention and affectionate care. Since this latter maneuvering is common to many invalids it may have a "non-specific" quality, i.e., almost anyone who is genuinely sick and dependent will show some tendency to regression along the road by which our character is built up. Similar processes are constantly at work in the neuroses, for the people so labelled are only those who have not attained a stable maturity out of the earlier developmental states because of their inner, often unrealized conflicts.

Case of Jc. Po. The patient is an 18-year-old farmer who sustained a severe head injury with unconsciousness of 5 hours' duration when hit by a passing automobile when he was eight years old. Family history is negative for epilepsy. He had been normal in behavior and school performance up to this time, but found school work increasingly difficult, so he quit at the age of twelve. His energy output, social and work interests decreased as he grew older. He had periodic headaches of four to eight hours' duration, apparently precipitated by exertion or heat. Poor tolerance of alcohol was present. During his fifteenth year he had a frank convulsion with tonic and clonic convulsions, incontinence, unconsciousness and a period of disorientation. No aura was reported. These convulsions recurred irregularly during the next two years, but he learned to avoid any situation which might precipitate them and did not have any for more than one year. No medical treatment was received during this time. A change of occupation requiring exertion and routine exposure to heat in his eighteenth year apparently caused recurrence of convulsions. The neurological and laboratory examinations, including roentgenograms of the head, were consistently negative. This case is illustrative of numerous others in which headaches appear earlier and occur with greater frequency than convulsions. He also demonstrated on the ward and in special tests the types of defensiveness against noxious stimuli

described above. Although ordinarily pleasant and coöperative when a request was made of him, he became tense and irritable if repeated demands were made of him, especially if the ward was noisy, and the directions given in a peremptory manner. He invented a routine for himself, took solitary walks, avoided activity in social groups, although he did like to talk to a few people. He wanted to do things but felt inadequate and, if pushed, became petulant and resentful. He was quickly downcast if refused minor requests. There was a pervading air of tension about him when he was active, which was relieved when he was able to sit alone. After one year's observation it is obvious that the prognosis is poor.

Case of J. P. The patient is a 23-year-old unmarried white male salesman who was kicked in the frontal region of the head by a horse on March 23, 1941. He was taken to a hospital immediately where he remained unconscious for about 36 hours, although he did arouse enough several times to talk to the nurses, but could not remember what was said. He was kept on bed rest for three weeks, but the first time he was allowed up he experienced a severe headache and blurred vision, with recurrence whenever he exerted himself, although he was free from symptoms for increasingly prolonged periods of time. On May 19, 1941, having been on a mild convalescent regime in the meantime, he arose from an afternoon rest period and fell unconscious after taking a few steps. There were no convulsions, and he regained consciousness after several minutes. At no time did repeated neurological or laboratory studies, including roentgenograms, or spinal fluid examination reveal organic disorder. On entrance into the hospital there was apparent slight bilateral edema of the optic nerve head and slight constriction of the left visual field which cleared up in two weeks. The headaches persisted during 341 days hospitalization, occurring at variable intervals of 3 to 20 days with variable severity. There was a slow tendency to improvement, but exertion beyond his expanding tolerance was certain to precipitate an attack. Careful review of his past life history as obtained from his parents and friends revealed no definite evidence of overt neurosis. His work record had been good, and that in a field where alertness, energy, sociability was required. In the hospital he was apathetic or tense at intervals, became quick to take offense and developed a temperamental sensitivity which was foreign to his previous character. He himself deplored his seeming preference for the empty activity of a hospital patient yet felt afraid to risk much activity because of the swift penalty of a headache. His former ambitions and pursuits were abandoned in order to spare himself pain. His mood was generally lowered with only occasional periods of cheerfulness. It was held that his present status was due to the injury and that he was eligible for compensation. Follow-up studies six and twelve months later revealed only mild improvement. Tests for abstract thinking seven and nine months after the onset revealed mild impairment.

2. *Conditions to be differentiated from posttraumatic personality disorder.* Those unfortunate individuals whose post-accident personality is altered principally or totally by the emotional components are usually said to have "posttraumatic hysteria." Since this subject is featured in another article in this symposium, only a few comments will be made for the sake of completeness. The following diagnostic classification taken from Ebaugh and Benjamin [13] will illustrate the principal clinical subdivisions.

Traumatic personality disorder (traumatic constitution).

Simple type with subjective complaints of headaches, vertigo, irritability, fatigue, impairment of memory, etc.
With secondary psychogenic symptoms.
With malingering.

Posttraumatic functional disorders.

Posttraumatic hysteria: a true hysteria precipitated by trauma in an individual with an underlying neurotic personality. May be accompanied by malingering.

Compensation neurosis: an hysteria in which the wish for compensation plays a leading rôle in the (unconscious) production of symptoms. May be accompanied by malingering.

Traumatic neurosis: a neurosis usually hysteriform with pronounced anxiety features ("terror neurosis"), in which the psychogenic mechanisms differ from those in ordinary hysteria, and in which trauma may be considered as one of a series of true causative factors.

Malingering.

The posttraumatic hysterias and compensation neuroses are generally believed to be forms of hysteria,[40, 67] although some authors [13, 15a, 33a, 33b, 59] are of the opinion that they are more akin to psychoses. If they are genuine hysterical patterns, manifesting themselves in the special setting following an accident, it may be assumed that they are purposeful. Usually this purpose is some type of gain: money, "invalidism," escape from undesirable responsibility, domestic difficulties or a disliked job. The important fact to remember, however, is that the patient with hysteria is unconscious of his true motives and insists quite honestly that he is suffering from a disability. Sometimes the unconscious emotional gains quite outweigh the material advantages and hence are sometimes known as "primary." If therapeutic foresight were utilized quite early in the illness by means of judicious medical and legal advice, rapid legal settlement, lump sum payments, and early activation, many chronic sequelae could be avoided.

The symptoms of posttraumatic hysteria may appear at any time after an accident. Unfortunately these subjective complaints may occasionally mimic those of the organic cases: headaches, dizziness, fainting, insomnia, easy fatigue, difficulties in memory or concentration and the concomitant mood changes of anxiety, heightened irritability and depression. If these symptoms appear more than six months after the accident they should be examined even more carefully than ever by prolonged observation, detailed pre-accident personality history, and special tests. To an experienced clinician the hysteric's complaints seldom are of the same character as those of a true organic case. When the hysterical complaints are those of functional paralyses, non-organic atypical anesthesias, hysterical gait or blindness the diagnosis is easy. When the symptoms resemble those of a true organic case it is necessary to demonstrate the positive signs of a neurosis as well as negatively to rule out the presence of organic injury. The diagnosis cannot be made by exclusion alone, hence it is imperative to show the past and present operation of hysterical mechanisms and character reactions.

Traumatic neurosis.

To clarify terminology, it should be stated that the concept of "traumatic neurosis" (a term originally used by Oppenheim to designate cases in which neither gross organic lesions nor true psychoneurotic mechanisms could be demonstrated) is used by Ebaugh and Benjamin,[13] Wechsler [72] and others for an acute anxiety state or panic reaction following such serious threats to life as occur in war, earthquakes, mining and sea disasters, but occur only rarely in ordinary automobile and industrial accidents. Strauss and Savitsky use the appropriate term "terror neurosis," a literal translation of the original designation of "schreckneurose" by Horn. Cases with severe head traumata seldom have this syndrome as a sequel, hence it is of little medico-legal importance in civilian life. They tend to clear up spontaneously, although characteristic dreams in which they relive the traumatic event repeatedly may persist.

Malingering.

This bitterly contested topic is well discussed by Strauss and Savitsky [66] and I. S. Wechsler.[72] Malingering is voluntary deception for gain, and may accompany minor injury or hysteria. Actually it is not very common.[13, 72] The diagnosis is usually not difficult.

> "Typical are gross inconsistencies in behavior and the production of mutually exclusive and contradictory symptom-complexes. The hysterical patient is really sick, no matter how "imaginary" his sufferings may seem to the layman; the hysteric is really unable to see; the malingerer, if he believes himself unobserved, will often betray himself in this respect. It requires extraordinary histrionic ability and presence of mind to malinger consistently over any length of time, and almost invariably the patient over-reaches himself in his efforts to convince the physician. Occasionally, however, prolonged observation is necessary. In any case, after the diagnosis of malingering as such has been made, the simultaneous existence of true posttraumatic organic or functional psycho-pathology must be excluded before we are justified in branding a patient as a pure malingerer, with the resultant total refusal of compensation." [13]

3. *Medical and legal concepts of "insanity."* Although the posttraumatic constitution or posttraumatic personality disorders are formally classed as traumatic psychoses, it may be well to mention that the medical and legal criteria of "sanity" are not identical. Medically, a patient is psychotic when palpable psychological damage is demonstrable, for if his judgment or insight is impaired at the basic levels of his functioning, it is unfair to him to be held responsible for acts which depend upon these fundamental functions. This does not mean that he cannot do a great many things very well; it only means that he may at any time do something wrong owing to the effects of the injury. With the development of secondary elaboration of his depression, aggressiveness, or paranoid trends he will, as a matter of course, be exposed to situations stimulating more anti-social behavior which may force him to be a litigant in some form.

4. *Organic and functional components of "traumatic" disorders.* From the descriptions it is apparent that the interplay between "organic" deterioration and "emotional" defences make difficult any quasiquantitative estimation. Both emotional shock and brain tissue damage can motivate regression to less mature integrations and less efficient action patterns. If sufficiently concrete information can be obtained about the patient's past levels of efficiency by skilled impartial investigators, the task of estimating the loss of efficiency will be less arduous. Many cases could be easily resolved if the true picture of the pre-accident personality were available. The biggest aid in differentiation between "posttraumatic hysteria" and "traumatic constitution" on direct examination, without benefit of the past history, will be the demonstration in the latter group of the organic type of intellectual deterioration.

We have stressed the importance of evaluating the entire personality and behavior before and after the injury in making an evaluation of the damage incurred. Some authors, notably Kennedy,[33c] believe that if headache and dizziness persist for more than four months in a man under 60 years of age they are to be regarded as neurotic symptoms, if the following seven criteria of head injury sufficient to produce organic changes in the brain are all absent—roentgen evidence of skull fracture, bloody spinal fluid, bleeding from skull orifices (especially from the ears), focal cerebral palsies, convulsive states proved to be posttraumatic, ventricular distortion proved to be posttraumatic, and a history of prolonged unconsciousness. It seems imperative that every physician testifying as a witness have available this evidence if it is possible to obtain it. "These criteria are of great value in giving a general orientation as to the probabilities in any case, but they seldom permit of a definite decision one way or the other without further examination. A history of prolonged unconsciousness is unquestionably of great importance, but many cases of head injury with such a history show no chronic mental or neurological sequelae; conversely, clinical, encephalographic and operative observations have proved that organic brain damage can be caused by head injury which was accompanied by unconsciousness of only a few minutes' duration or, rarely, by none at all. The same holds true, to an even greater degree, of skull fracture and bleeding from the ears. The other criteria mentioned are certainly strong presumptive evidence of organic brain damage, when they are present; their absence, however, does not exclude the possibility of such damage." [13]

In addition to the neurological and laboratory aids mentioned, every physican will want a thorough psychiatric examination comparing personality changes alleged to be present with the actual facts as elicited from impartial witnesses. The sensorium will be tested by careful and repeated examination of the retention and recall using pictures and objects as well as digits. Adaptations of Head's tests for aphasia are useful: (*a*) naming and recognition of six or more common everyday objects, together with

reading the names of these objects on cards and writing the names and speaking them; (*b*) naming and recognition of color using eight colored silks as in (*a*); (*c*) testing elementary reading of very simple sentences, then asking patient to write very simple sentences, then asking patient to write them from memory and from dictation; (*d*) asking patient to tell the time from cardboard clock faces with movable hands and asking him to set them at stated times; (*e*) in succession the patient is asked orally, and by written command to place each of four coins in a saucer; (*f*) patient is asked to imitate movements made by the examiner's hand in pointing to his own ear or eye; the test can be varied having him imitate the movements of the examiner as reflected in a mirror; (*g*) the patient is asked to repeat the alphabet, days of the week, months of the year and various combinations; (*h*) the patient can be asked to read a paragraph and repeat its meaning; (*i*) graduated arithmetic tests, puzzles, drawings, and simple games are also valuable. Speed as well as accuracy should be recorded. The usual psychometric examinations (Binet, Terman, Bellevue) may show "scattering" of a degree and type which is more valuable than the formal test score. D. Wechsler's criteria for the organic syndrome will be discussed in this connection in Section III of this paper along with the more specific tests (Rorschach, Goldstein, Halstead, Shipley, Weigle, Kohs, Bolles, Kraepelin). Each physician will select those tests which seem most valuable for the specific examination involved, or those which he is best fitted by training or temperament to manipulate.

Because the differentiation between the "functional" and "organic" components of a case is often of paramount legal importance, all professions must ally themselves in the concerted search for methods of description which will avoid the unhappy legal contests where public opinion, subject to emotional prejudice, decides the contest.

C. Posttraumatic Mental Deterioration (Dementia):

(1) *Symptomatology.* The deterioration following severe head trauma is usually manifested soon after the accident, with or without a protracted delirium, obvious skull fracture, bloody spinal fluid or increased intracranial pressure. Some apparently mild head injuries are followed by gradually developing dementia. The signs and symptoms are much like those described earlier under posttraumatic personality disorders, but here the signs of dementia are gross and less debatable.

(*a*) Psychological and social symptoms. The generalized retardation in initiating all activity and slowed reaction time are more obvious.[11, 20a, 47, 71] Attention, "especially of the habitual and passive type," [5] is reduced along with extensity,[27] vigilance, tenacity.[6, 63] The memory, especially of recent events, is markedly impaired; defensive confabulations and pseudo-recollections, often of an absurd variety, occur. If placed under strain the memory

[27] Extensity: inclusiveness or breadth.

defect augments the picture of disorganization, with resulting confusion and amnesia. If pushed too hard the panic state or "catastrophic reaction" occurs.[20a] Associations are more limited in number and quality, and the likelihood of creating spontaneous combinatory forms in tests is greatly reduced.[20a 24a, 47, 51] Complex pictures are no longer easily understood when presented for recall and analysis.[6, 20a, 22, 24a, 47] There is definite "inability to shift" easily from one topic to another.[24a]

Because the predominating emotion in the "organic" patient is one of apprehension and dread when under pressure, the choice of alternatives of action is often poor, hence we say the judgment is poor especially where the defective memory and other deficits blunt long-range goals or ideals. This is of great importance in the spheres of moral behavior for these aberrations are of legal concern. While he does not truly lose his ethical appreciation in general, he does suffer from a lowered ceiling of comprehension, and a constriction of his appreciation of social values. Although the patient's habits and traits of character resemble his pre-traumatic personality, it can be demonstrated that his deficits—impaired memory, relative decrease in comprehension of abstractions including ethical concepts and ideals, variable "insight for complicated relations," heightened egocentricity due to loss of awareness of larger social frames of reference—all contribute to serious incapacity for exercising proper judgment and control.

The loss of social orientation can be seen in their talking when they should not, missing or disregarding the usual social cues, and failing to show proper respect or restraint. Occasionally this mild disorientation is further complicated by senseless delusions, clumsy actions induced by fear, or even pronounced confusion and panic.

(*b*) Physiological impairment. More fundamental physiological impairments may cripple the patient beyond anything we have known to date, thereby altering our attitudes and expectations. Halstead [24j] has found "that patients with frontal lobe lesions, for example, have a constricted dynamic visual field as compared with their perimetric field. The dynamic visual field is defined as the portion of the retinal field in which a visual impression can be evoked at the same instant that a form discrimination is being made by the fovea.[28] This means that in certain types of situations, events or objects in the peripheral portions of the visual field do not constitute a normal perceptual background, but become sporadically introduced due to the accidents of eye movements or gross shifts in posture. Variability and instability and an interesting kind of anxiety are the consequences of this alteration. The patient with a frontal lobe lesion has a full perimetric visual field, but in many types of situations he actually has available less visual field than the patient with a frank hemianopia.[29]" Such a basic disturbance is of

[28] The fovea is the small depressed area near the center of the retina at which keenest daylight vision is possible.

[29] Hemianopia is blindness in one half of the visual field; it may affect one or both eyes.

utmost importance in determining visual efficiency and all that depends upon it; dynamic interpretation of symptom-constellations and more specific systematic rehabilitation are considerably advanced by such discoveries.

(*c*) Course and development of symptoms. A vital subject of immediate practical importance should be reviewed at this point. The disappearance of these various abilities is not uniform in magnitude or time. It seems that older, well established action patterns in the ethical, language, occupational and social spheres, in fact, the dominant personality patterns are the most persistent and the last to break down. These are overlaid with either newly created compensatory mechanisms or exaggerated forms of old ones, or old ones, augmented. This usually leads to the acceptance of the injured man as competent, although he is really balancing himself along a precarious path. These older patterns provide the patient with a stable reality axis for himself. In these senses the patterns are to be considered assets. They are also liabilities because they are socially disarming, tending to obscure the underlying pathology in the patient, thus leading the social group to expect too much and the patient himself to aspire too high.

Special mention must be made of the legal complications inherent in the dementias found in elderly people who were senile or arteriosclerotic before the injury. As mentioned earlier, psychosis is much more common in the advanced age groups; furthermore, the patient's confusion due to the underlying disease may have been the source of the accident, as in cases of epilepsy (convulsive states), alcoholism or diabetes. Since the deterioration of the arteriosclerotic is also organic, much more research is necessary to differentiate with even approximate certainty the damage sustained by the injury.

Case of Be. Ho. This 24-year-old white male university student fell off a moving train on November 6, 1941 and sustained a severe right frontal concussion with probable damage to that frontal and prefrontal lobe. He was unconscious for four days. A spastic paralysis of the extremities on the left side was present but disappeared after five or six days. He was in a typical delirium with confusion and disorientation for six days after he regained consciousness. There was a complete retrograde amnesia lasting 15 months, for events leading up to the accident. Early in his convalescence character changes became apparent which contrasted markedly with his behavior before the accident. He had been, according to friends and relatives, a healthy, cheerful, somewhat willful youth who had no disciplinary or scholastic problems in school. He was athletically skillful in several sports and was able to make the school teams. One physician characterized him as being "aggressive, ambitious, outgoing and happy-go-lucky." He seemed well balanced with no undue religiosity, euphoria, depression, anxiety, neurotic defenses or psychosomatic complaints. His left hemiparesis cleared up completely within three months but his mental status did not keep pace with his physical status. Two months after the accident he was garrulous and partially disoriented for time and place and for persons he saw daily for weeks. In answer to direct questions he confabulated various answers which were mutually contradictory. He could not accept the evidence from these facts that his recent memory particularly, and his remote memory to a less marked degree, were quite defective. He insisted that he was absolutely well and should be allowed to go to a flying school for pilots.

If examinations of the sensorium were too pointed he attempted to get the doctor to reassure him that he was well. Tension and anxiety were obvious in his dealings with people but he was able to spend many hours peaceably in his room alone. His mood was euphoric. He claimed that he was very happy, that the accident did him some good since he had become pious, whereas before he was sinful. "Now I definitely feel superior, and am superior to what I was before the accident. I thank God for the new thoughts I now have." As time went on his religious activities grew. He read prayers daily, went to church as often as possible, called on the chaplain frequently, and talked about religion in a grandiose incoherent fashion with anyone who would listen. He wrote bad poems and indulged in artificial, stilted mannerisms of speech with exaggerated politeness and affectation. Four months after the accident he had no neurological signs on the left except for a slight muscular atrophy, hyperactive deep reflexes and a positive Babinski sign. The visual fields and fundi were normal except for slight dilatation of the retinal veins. He was now well oriented with improved recent and remote memory but the amnesia for the accident persisted. He passed the Stanford-Binet test with a score of 122 with notable improvement in retention, reversing six digits, making word pairs, arithmetic, and reversing the hands of the clock. His ability to interpret fables and proverbs, and define differences between abstract words was not as good as the other performances. His insight into his own condition and his judgment regarding his abilities remained defective; he continued to make preposterous plans for himself. A spinal fluid examination five months after the accident was essentially normal. Fifteen months after the injury he was somewhat embittered and nagged persistently because he was not permitted to attend the aviation school. He has held an electrician's job in a defense industry with only mediocre success, and with little promise of greater improvement.

Summary, Section I

Posttraumatic Personality Disorder.

The posttraumatic personality disorders are a large group of psychoses whose classification and differentiation have been the object of voluminous publication. The standard authors cited have clarified much confusion in this complex field but oversimplification is to be avoided in order to do justice to the facts. Psychiatric and special psychological tests with improved case work will help the courts in their efforts to define the nature of the injury, its causal relation to the posttraumatic state, and the amount of disability incurred from the injury. Every competent medical witness now works up his case in accordance with the standard practices in modern textbooks of neurology and psychiatry, with roentgenograms, visual fields and fundi examinations, cerebrospinal fluid studies, encephalograms, etc. In the future he may find it profitable to demonstrate the presence of cortical damage by psychological means, especially when the physical signs alone give but incomplete testimony to the true extent of the damage.

II. Examination Methods

The need for improved methods of detecting, describing and treating disturbed mental functions is unquestionable. In patients who show little or no mental defect in an ordinary clinical examination, an extensive detailed

psychiatric examination may reveal much gross pathology, and the use of *specific tests for evaluating specific functions* is even more likely to bring to light the real damage present. Ebaugh and Benjamin,[13] Strauss and Savitsky,[66] Halstead,[24a] Bowman and Blau,[8] Gross and Ehrlich [22] all recommend the use of special psychological tests to bring out the defects, many of which remain operative *long after the physical symptoms have abated.*[11] Obviously, litigants will be much interested in the results of such tests as aids in clarifying their position. The basic approaches will be described first, to be followed by exposition of the individual tests which may be of use in forensic medicine. Since many of the methods are new and abstract they will need much adequate exposition in order to be as convincing to a jury as a physical finding, but persistent usage will overcome the resistance to the new and strange.

To develop such methods a variety of approaches is being utilized. Among these diverse approaches "war injury" cases, including gunshot injuries [40, 42, 55] and "tumor" cases [1, 2, 9a, 9b, 9c, 17a, 21, 24a, 26, 31, 43, 45, 69] have been more promising than earlier clinical descriptions of developmental anomalies, vascular cases, or cases following infections or degenerative disease.[24a, 31] The studies of Goldstein deserve special mention for persistent utilization of qualitative methods and for thus helping open the new roads to understanding mental function. The clinical cases of Brickner, Ryland, Alford, Ackerley and Halstead are well known recent contributions. Halstead has enjoyed the advantage of having human cases who are, in effect, special preparations. The surgeons, Drs. P. Bailey, Paul Bucy and E. A. Walker were careful in doing routine operations to chart as accurately as possible the location of the lesion during operation; furthermore, clips (essential to stop hemorrhage) were inserted at strategic points to outline the lesion for roentgen examination later. Thus a revolutionary refinement was introduced making possible studies in human cases comparable to those on animals, and giving access to accurate information not obtainable in any other way.[24a]

A. Contributions of Animal Studies to Methodology.

The "animal approach" would not seem at first glance to be very useful for the elucidation of human thinking, yet the work of H. Kluver is so outstanding in this regard that his highly original practical technics, called the method of "equivalent stimuli," worked out with exceeding care, together with his superb analysis of the theoretical questions involved in setting up a meaningful experiment and of the difficulties of correct interpretation of results, make this work necessary reading. Traditional methods for the examination of cerebral function have been inadequate according to Goldstein and Kluver. The latter author utilizing monkeys, was able to create specific brain lesions which could be studied more profitably than the diffuse, poorly defined lesions available in humans until quite recently. Other investigators, notably Carlyle Jacobsen [29] working with apes, also followed this reasoning. It is because the studies on animals are useful for understanding human beings

that this work is presented. "It has not yet been generally recognized, unfortunately, that the considerations which Kluver has raised concerning methods of studying behavior apply to *any analysis of behavior* whether the organism involved be insect or rat, monkey or man." [24a] Lashley justly praised this method in 1933 when he wrote that

"Dr. Kluver's monograph sets a new standard for analytic studies of behavior. He has proposed the question, Just what properties in complex sensory situations are significant for the animal's reactions? and has carried out the investigation with unique thoroughness. As a result, he presents for the first time something approaching a complete picture of the perceptual world of an animal. This perceptual organization is surprisingly like that of man. Not only are the animals sensitive to the same physical stimuli but for them also the relational properties of the situations are the same. As with man, reactions are but little dependent upon the simple physical properties of the stimulus but rather upon abstract relations which may subsist in physically unlike situations. The processes of abstraction and generalization involved in the perception of similarity and difference seem as efficient in the Macaques as in man and not fundamentally different.

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"The most immediate value of the study is in laying a foundation for investigations of the neurophysiology of behavior. Clinical evidence is far from adequate to settle the major problems of nervous integration and of the organic mental disorders and must be supplemented by experimental studies. But experimental neurology has made little progress toward an understanding of the mechanisms of thinking for lack of an adequate knowledge of the normal behavior of the animals studied and of means of detecting any but the grossest disorders of behavior. The data and methods, here made available, open the way for an experimental attack upon many of the problems of sensory agnosia and the organic disturbances of thinking.

"In brief space it is impossible even to mention many other problems of psychology upon which the data accumulated by Dr. Kluver have significant bearing. In his own interpretation of the material he has maintained a wise conservatism. His discussion of the principles of interpretation in psychological studies seems to me one of the most important recent contributions to theoretical psychology. He is skeptical of formulas, whether they be the schemata of behaviorism, the field properties of the configurationists, or the images and ideas of structuralism, and justifies an experimental and phenomenological approach to the problems. In the infancy of a science generalizations are rarely true beyond narrow and too often undefined limits. The important contributions to psychology are not the classifications which confuse the issues, the explanations which overload the problems, and the neologisms which disguise our ignorance but the tracing of relations through the intricate web of dependent processes which is mind. Always the question, How? punctures the bubble of theory, and the answer is to be sought in analysis and ever more analysis." [36a]

B. Method of Equivalent Stimuli.

The need for investigating behavior by this method is well described by Halstead:

The problem of equivalence in the analysis of behavior has been dealt with in its various aspects by Kluver and will be considered here only in a general way. This problem arises most prominently in connection with various forms of behavior which remain unaltered in the presence of marked change in the environmental stimulus con-

stellation. Such forms of behavior do not persist unaltered in the presence of all changes in the stimulus constellation, however. Using Kluver's terminology, it becomes convenient to refer to the stimuli in the first situation as "equivalent stimuli" and to those in the second (in which the response in question is altered) as "non-equivalent stimuli." Interest in such differentially stable forms of behavior does not end with the discovery (for a particular response) of a number of "equivalent" stimuli, i.e., an "equivalence range." In fact, primary concern in a given situation is an answer to the question: "What property or characteristic of equivalent stimuli is responsible for equivalence?" It may be observed, for example, that under certain conditions: (*a*) solid squares, solid and outline ellipses, solid and outline circles and line drawings of a "star" of certain sizes, when projected symmetrically at the monocular fixation point of a nulle vision hemianopic patient, will be seen by him as whole or "completed" figures whereas (*b*) squares or ellipses of a particular size, straight lines, diagonal lines, less than half a circle, or a picture of a dog, face, bottle or butterfly will be seen as part figures or "uncompleted." In line with the preceding discussion, the stimuli of A, in terms of "completion" behavior, may be referred to as "equivalent stimuli" whereas the stimuli of B with reference to "completion" behavior may be termed "non-equivalent stimuli." Clearly, where questions of such biological importance as "seeing" and "not seeing" are involved, it is not sufficient to know that *A* stimuli and *B* stimuli exist. It becomes important to know what property or characteristic of the *A* stimuli makes it possible for them to be "seen," i.e., "completed." It should be clearly recognized that whatever this property or characteristic is, it is, in a certain sense, present in the *A* stimuli only and yet cannot be defined without analyzing the properties of the *B* stimuli.

The "method of equivalent stimuli" is utilized in novel form by Halstead [24a] in his human cases which have been carefully studied for a long period, some of them for five or more years. His observations are not dependent upon sporadic clinical investigation but are a part of a systematic research program in the best sense. He finds that the grouping behavior of individuals with one frontal lobe, whether right or left, differed from normals in the following ways: reduction of the number of objects "spontaneously" employed; reduction in recall of objects from the test-field; absence of grouping effect in recall performance; differences in the distribution of the groups produced. Interested readers are referred to his original paper for a presentation of his test materials and methods because all qualitative examination technics required unusual care and training. Unfortunately some of these methods, especially the Rorschach ink-blot experiment, have acquired unwarranted criticism because of superficial application by untrained workers.

C. Prefrontal Lobotomy Approach.

Recently a unique opportunity for studying cerebral function has been opened up by the "prefrontal lobotomy" [30] cases,[17a, 17b] i.e., psychotics treated by the Moniz or other methods of prefrontal lobotomy for relief of psychiatric symptoms. This would seem to be an ideal and plentiful source of

[30] Prefrontal lobotomy is the surgical operation in which the prefrontal lobes of the brain are separated mechanically from the frontal lobes.

desirable material but there are several disadvantages: The subjects were not "normal" before surgery and may introduce too many uncontrollable variables in all evaluations; moreover, the proponents of these methods have not employed the more refined systematic methods over a sufficiently long period of time to yield new results.

D. Standardized Mental and Personality Tests

(1) *Actual Life Performance.* In order to gain a better perspective of the range of mental testing methods it might clarify the profusion of available tests to categorize them as tests of: (1) actual life performance, (2) general abilities (abstraction), or (3) special functions (memory, attention, retardation). Bleuler[6] said aptly, "all theoretical tests can be passed faultlessly, while the patient is perfectly unfit to manage his own affairs.—Life is really the only sure touchstone. What is here said concerning theoretic examinations should only be considered as illustrations and suggestions for individual procedures. It is impossible to prescribe all that is to be examined in the individual case. It is not always of special importance what one talks with the patients, but how one observes and how one concludes.—The most important thing is always the judgment of the observations and inquiries. Despite all rules the intelligence test is as much a test of the doctor's intelligence as of the patient's intelligence." Students will have no trouble in recognizing the adherence of K. Goldstein, H. Kluver and W. C. Halstead to these principles. Owing to a number of limitations which are discussed by K. Goldstein,[20f] it has not been found feasible to obtain the apparently ideal description of a patient's mental status from his behavior in his accustomed environment. In the test situation the patient was not actually working at his old job. First, the more the project resembled the real job, the more likely it was to introduce emotional factors based upon the man's willingness to recover with or without compensation. Secondly, the operations involved in most skilled occupations are too complex to be adequately controlled against the performances of similar patients or of normal individuals. Thirdly, the simulated work does not reveal the defects in the spheres of general abilities, but only in the specific kind of work being done; Goldstein believes that general tests reveal much more about the causes for the failure in the specific operations. However, if these three limitations are kept in mind, testing a patient under simulated real-life conditions has advantages which may help juries to make decisions. Work shops are also of great therapeutic aid to convalescent patients as an extension of the usual hospital occupational therapy, for patients are more strongly motivated to do their best, and may re-acquire lost skills.

E. Tests for Abstract Ability.

Although Kluver makes abundantly clear that the concepts of "abstract" and "concrete" are relative terms, definable only with a special experimental

situation, the tests for abstract ability are among the most important we have for the following reasons given by Goldstein [20a]: (1) The experimental frame of reference can be controlled. (2) The results can be recorded in detail with reasonable accuracy, making possible comparative data and statistical analysis. Graphic representation is possible and often useful. (3) All types of patients can usually be motivated, if managed with skill, to cooperate in working at appropriately selected tests. (4) Even sick patients can be given tests repeatedly under similarly controlled conditions because of their simplicity. (5) Previous training and attitudes are minimized and hence large groups can be compared, whereas in real life testing of special abilities such comparisons are difficult. It is important to realize that no one test can encompass the whole field of abstract thinking. Moreover, it is even more important not to judge the patient's performance merely by end results but by his mode of achieving them. Simple plus and minus results are inadequate for final evaluation of capacities. It is necessary to understand *how* the patient achieves his results, the methods or devices by which he attains them regardless of whether they are right or wrong. K. Goldstein has presented many excellent examples of such analysis.[6 and 20a] The specific experiment used is chosen for what it will elicit but the evaluation of the results is not mechanical as in standardized tests such as the Binet, Terman or Bellevue-Wechsler.

Many tests have been devised for qualitative analysis utilizing heterogenous material.[24a] The best use of these has been in Halstead's special adaptation, designated as a "category test." [24a] Here the performance of patients with single frontal lobe lesions exhibits definite properties which can be graphically presented and compared with those of normal individuals and of patients with lesions of other types.

For testing abstract thinking, the usual mental status examinations in the psychiatric texts have a variable range of materials such as numbers, stories, proverbs, and problems. The addition of pictures and diagrams in test situations is helpful. A short compact test utilizing these principles was devised for rapid clinical use by Dr. J. D. Benjamin and associates at the Colorado Psychopathic Hospital. Many doctors use the readily available Wells and Ruesch "Mental Examiners Handbook" [74] as a source of diverse test material employing verbal and pictorial problems.

The Shipley-Hartford test is a standardized vocabulary and abstract thinking test which offers a helpfully quick (20 minutes) but not very complete means of estimating whether gross organic defect is present.[61] Methods like this one may find favor in cases in which the defects are quite extensive.

Benton and Howell [5] have published a case study illustrating the use of several tests mentioned (Shipley, Rorschach) and in addition the Kohs Block Test,[35] the Bolles Object Sorting Test,[7] the latter superficially similar but differing from Halstead's category test, the Weigle Color-Form Sorting Test,[73] and the similarities test of the Bellevue scale.[71]

D. Wechsler [71] offers the Bellevue-Wechsler test as a means of detecting gross organic damage. He lists the following results (subject to many qualifications) as indicative of an organic mental status: (1) Verbal scores higher than performance test scores. (2) Information: relatively good. (3) Comprehension: relatively good. (4) Arithmetic: poor. (5) Similarities: poor. (6) Memory span: very poor, particularly for digits backwards. (7) Block design: very poor. (8) Object assembly: poor. (9) Digit symbol: very poor. (10) Small variability when verbal and performance test scores are considered separately.

Further information regarding methods of testing deterioration may be studied in the clinical fields other than the organic psychoses. The expert work of E. Hanfman using the Vigotsky test,[25] Henry Murray's popular "Thematic Apperception" test [44] and H. Babcock's [4a, 4b] studies on deterioration are interesting in this regard.

One serious drawback to all these tests is the absence of a test record taken before the injury occurred. Relatively few people in civilian life have ever had even a standard intelligence test. In all tests inferences from the contemporary record regarding the pretraumatic status furnishes the basis for describing the changes said to be due to trauma. More often the evidence for deterioration is compared with the pretraumatic clinical picture as obtained by history from witnesses (friends, relatives and business associates). It would be highly desirable to have available pretraumatic behavior records taken in the same medium as records made posttraumatically. One such medium is available for most patients—their handwriting. Handwriting analysis has demonstrated its clinical usefulness in the competent hands of Klages, Pulver and their pupils in personality interpretation.[32a, 32b, 39] Their studies have not included large groups of the posttraumatic psychoses although there are some suggestions that this would be a useful field of inquiry. The old psychiatric texts (Bleuler) contain samples of handwriting allegedly recognizable as "organic."

One of the best developed qualitative methods of examination is the so-called Rorschach Ink-Blot experiment.[34] In the hands of skillful students the deductions possible from the patient's replies to these ten standardized ink-blots are often startlingly true. E. Oberholzer [47] published an excellent paper on the case of posttraumatic personality which has been a model for later work. Incidentally, Oberholzer while in Switzerland was permitted to use his material as legally admissible evidence in his capacity as witness in head injury cases. Piotrowski [51] lists the following "findings" as characteristic of an "organic's" Rorschach performance: 1. Reduction in number of responses. 2. Absence of kinesthetic responses.[31] 3. Form per cent lowered. 4. Prolonged time needed for reply. 5. Color naming. 6. Repetition. 7. Perseveration. 8. Impotence (giving a response in spite of the recognition of its inadequacy). 9. Perplexity. 10. Automatic phrases. The presence

[31] Kinesthetic responses are those which contain human figures seen in significant action.

of five or more of these "signs" is supposed to indicate the presence of head injury, according to Piotrowski, but other work questions the reliability of such atomistic dissection.[29] The real value of Rorschach interpretation derives not from single signs which it yields, but from its capacity for revealing action patterns or levels of performance.

Kelley has summarized the Rorschach articles available up to 1942 that relate to organic cases.[29] Rorschach technic, like any other technical skill is not acquired without genuine application, intelligent direction and careful study of many types of clinical cases. Its use of field concepts [32] is an excellent introduction to the methods of qualitative analysis. The interpretations made possible by this method are a convincing demonstration of the value of the general approach when compared with the more atomistic approaches, for here an evaluation of many other qualities of the personality are possible besides the "intelligence." Some of these qualities are: capacity for inward living, capacity for external expression, affective adaptability, oppositionality, creativeness and originality, stereotypy, capacity for dealing with ideas and things, accuracy of perception, etc. There is the opportunity in most records of describing the type of neurosis concomitant with the head injury and of estimating the availability for therapy. It may be remarked in passing that, in general, neuroses are not improved by cortical damage, including lobotomy.

F. Tests of Special Abilities.

Tests of special abilities are numerous and helpful. The addition test of Kraepelin remains one of the best for studying the patient's attention, capacity to learn, persistence and fatigability.[20a, 63] Performance graphs are of real help in visualizing the experiment. The slope at the beginning, the fluctuations of the plateau, the gradual decline or sudden end, the general average height, the number of errors are studied for the light they throw on the nature of the patient's abilities. The reaction test combined with a situation-compelling choice is favored by K. Goldstein.[20a] He also uses ergographic tests developed in general physiology for studying fatigue and work capacity. The special tests in psychometric examinations for recall, calculation, various memory tests both visual and auditory, dexterity tests for various types of performance all furnish material for exploring the patient's abilities.

G. Psychoanalytic Studies of Traumatic Psychoses.

The content of traumatic psychoses has not been extensively examined by psychoanalysts yet the few papers on other "organics" available furnish interesting leads for further work.[15a, 15b, 16, 30, 36b, 59] Fenichel states in sum-

[32] A field concept describes the "subject-object" (patient-environment) relationship as an active, organized, continuous process.

mary "Ferenczi and Hollos seem to have proved that much of the symptomatology of general paralysis is not a direct consequence of the degenerative processes of the brain, but an indirect pathoneurotic reaction to the patient's own observation of his organically determined loss of cerebral function. Psychoses which develop after mutilating accidents are also based on a narcissistic regression [33] of the pathoneurotic type. The function of these psychoses is very evidently to deny the unpleasant reality, and their clinical picture is dominated by the conflict between the tendency to deny and the perception of the real state of affairs so that projections, etc. appear." [15b] Kardiner's large monograph on "Traumatic Neuroses" [33a] has many interesting case histories with emphasis upon the social frame of reference, developmental and conditioning forces, which are not our immediate interest. His emphasis upon the "adaptation" principle,[34] and comparative neglect of the instinctual forces [35] will be received with varying judgments, depending upon one's point of view. Most psychoanalysts will feel the deficiency serious, whereas non-analytic readers may find this simplication attractive.

Among the special tests, some readers will miss the voluminous work on problems in aphasia, apraxia,[36] agnosia,[37] amusia.[38] These and other "individual" defects are properly examined as a part of a standard careful neurological examination. The theoretical and therapeutic problems involved are discussed in the publications already cited.

Summary

The three types of traumatic psychoses have been discussed with special emphasis upon those cases in which the physical indicators are inadequate to measure the damage. Even such gross disturbance as a visual agnosia may soon be compensated for to a remarkable degree even though it persists; incapacitating functions such as the "constricted dynamic field" are being newly uncovered which further stress the need for a careful examination for all patients to establish their true physiological competence. In the majority of cases psychological means are necessary for evaluating the extensity and severity of the damage to a person's capacities and personality organization.

[33] Narcissistic regression refers to increased evaluation of the self, causing greater preoccupation with the body and its functions, hypochondriasis or undue concern over the body, greater selfishness, egocentricity, and sensitivity to acts which may disturb the patient.

[34] Kardiner believes that although elementary drives (instincts) exist, the symptoms we observe are not to be construed as direct evidence of the operation of these drives. He describes the neuroses as action syndromes whose form is more important than the content. The adaptations, made by various functioning units of the whole personality in its effort to gain effectual stabilization, are his major consideration.

[35] Instincts are elementary drives such as eating, eliminating, mating and self-preservation.

[36] Apraxia is the loss of ability to perform purposeful movements.

[37] Agnosia is the inability to recognize the meaning of sensory stimuli although the organs mediating them are organically intact.

[38] Amusia is the inability to produce or to comprehend musical sounds.

Several problems, important in legal actions, are discussed: (1) The differentiation between organic and neurotic behavior patterns. (2) Amnesia, legal responsibility and dynamics of the "organic" syndrome and deterioration. (3) Methods of distinguishing the true organic defects, even though obscured by compensatory mechanisms which give the superficial appearance of a good adjustment. Such differentiations are not always easy, even though legally important. Much more groundwork needs to be done and the head-injury cases from the war will provide added impetus for study and treatment. Scientifically, these cases together with the "tumor" and "lobotomy" series offer an unparalleled opportunity for man to study cerebral function by methods unavailable up to this time. Although all methods of study have merit, it is believed that the "qualitative" technics promise the most fruitful results.

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Rev. —; (April 1943) 15 Rocky Mt. L. Rev. —; 17 So. Calif. L. Rev. (April 1943) —; 20 U. of Chi. L. Rev. (April 1943) —; 29 Va. L. Rev. (April 1943) —; 53 Yale L. J. (May 1943) —.

PART I

LAW-MEDICINE PROBLEMS AND SCIENTIFIC THOUGHT

II. Clinical Forensic Medicine

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(* Physician in Charge of Occupational Diseases and Injuries of Municipal Employees, New York City; Fellow, American College of Chest Physicians; Chairman, Committee on Tuberculosis in Industry, American Trudeau Society.)

(** Medical Examiner in Division of Workmen's Compensation, New York State Department of Labor.)

(3) Moritz,* Dr. Alan Richards, The Mechanisms of Head Injury, 117 Ann. Surg. (April 1943) 562; 23 B. U. L. Rev. (April 1943) —.

(* Professor of Legal Medicine, Harvard Medical School; Lecturer in Legal Medicine, Tufts College and Boston University; Pathologist to the Department of Public Safety and Consulting Pathologist to the Department of Mental Health of the Commonwealth of Massachusetts.)

(4) Denny-Brown,* Dr. Derek Ernest, Factors of Importance in Head Injury—A General Survey, 1 Clinics (April 1943) 1405; 29 Va. L. Rev. (April 1943) —.

(* F.R.C.P., London; Professor of Neurology, Harvard Medical School; Chief of the Neurological Division, Boston City Hospital; formerly Neurologist to St. Bartholomew's Hospital, London.)

(5) Munro,* Dr. Donald, The Late Effects of Craniocerebral Injuries—A Consideration of the Criteria Necessary to Evaluate the Possible Causes, 117 Ann. Surg. (April 1943) 544; 23 B. U. L. Rev. (April 1943) —.

(* F.A.C.S.; Surgeon-in-Chief for Neurological Surgery, Boston City Hospital; Asst. Prof. of Neurological Surgery, Harvard Med. School; Assoc. Prof. of Neurological Surgery, Boston Univ. Med. School.)

(6) Solomon,* Dr. Harry C. and Smith, Dr. Hubert Winston, Traumatic Neuroses in Court, 99 Am. J. Psychiat. (May–June 1943) —; — L. Rev., Summer, 1943.

* Clinical Professor of Psychiatry, Harvard Med. School; Chief of Therapeutic Research in the Boston Psychopathic Hospital; Visiting Neurologist to the Beth Israel Hospital, Boston; Assistant Visiting Neurologist to Massachusetts General Hospital, Boston.)

(7) Ebaugh,* Lt. Col. Franklin G. and Brosin,** Major Henry W., Traumatic Psychoses, 18 Ann. Int. Med. (April 1943) 666.

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(** Chief, Neuro-Psychiatric Section, La Garde General Hospital, New Orleans, La.; Asst. Prof. of Psychiatry, Univ. of Chicago Med. School, Chicago, Ill.—on leave of absence.)

(8) Cobb,* Dr. Stanley and Smith, Dr. Hubert Winston, Relation of Emotions to Injury and Disease—A Call for Forensic Psychosomatic Medicine, 18 Ann. Int. Med., Aug. 1943), 56 Harvard L. Rev. (Summer 1943).)

(* Bullard Professor of Neuropathology, Harvard Medical School; Psychiatrist-in-Chief, Massachusetts General Hospital, Boston.)

(9) Merritt,* Dr. H. Houston and Solomon, Dr. Harry C., Relation of Trauma to Syphilis of the Nervous System, 117 Ann. Surg. (April 1943) 623; 23 Boston U. L. Rev. (April 1943) —.

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(* Fellow, Am. Public Health Assn.; Chief, Dermatoses Investigations Division, U. S. Public Health; Adjunct Professor in Dermatology, Georgetown Univ. Med. School; Lecturer, N. Y. U. College of Medicine.)

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(14) Bennett,* Dr. Granville Allison, Medical Criteria Which Govern Relations of Trauma to Joint Disease, 1 Clinics (April 1943) 1448.

(* Associate Professor of Pathology, Harvard Med. School; As of May 1, 1943, Professor and Head of Department of Pathology in the Tulane Medical School, New Orleans.)

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(21) Wolff,* Dr. Harold G., Hardy,** James D., and Goodell,*** Helen, The Pain Threshold in Man, 99 Am. J. Psychiat. (March–April 1943) —.

(* Associate Prof. of Medicine, Cornell Medical School; Staff, The New York Hospital, N. Y. City.)

(** Ph.D., Special Research Associate of Dr. Wolff in experimental studies on the pain threshold in man.)

(*** B.S., Special Research Associate of Dr. Wolff in experimental studies on pain threshold.)

III. Forensic Pathology

(22) Leary,* Dr. Timothy, How a Modern Medical Examiner's Office Functions in a Typical Investigation of "Sudden Death"; Points of Superiority over Coroner's Office, 18 Ann. Int. Med. (July 1943) —.

(* Medical Examiner for Suffolk County, Mass.; Lecturer in Legal Medicine, Harvard Med. School.)

(23) Jetter,* Dr. Walter W., When Can It Be Said That Death May Be Caused or Contributed to by Acute Alcoholism, 1 Clinics (April 1943) 1487.

(* Instructor in Legal Medicine, Harvard Med. School; Assistant in Neuropathology, Harvard Med. School; State Pathologist, Mass. Dept. of Mental Health; Acting State Pathologist, Mass. Dept. of Public Safety; Member National Safety Council Committee for Standardization of Tests for Alcoholic Intoxication.

IV. Scientific Crime Detection

(24) Hoover,* J. Edgar, The Scientific Crime Detection Laboratory, 1 Clinics (April 1943) 1503; 20 U. of Chi. L. Rev. (April 1943) —.

(* Director, Federal Bureau of Investigation, U. S. Dept. of Justice.)

(25) Wigmore,* Prof. John H., Circumstantial Evidence in Poison Cases, 1 Clinics (April 1943) 1507; 23 B. U. L. Rev. (April 1943) —.

(*Professor of Law and Dean Emeritus, Northwestern Univ. Law School, Chicago, Ill.)

(26) Walker,* Dr. Joseph, Scientific Evidence in Poisoning Cases, 1 Clinics (April 1943) 1520; 23 B. U. L. Rev. (April 1943)—.

(* Instructor in Legal Medicine, Harvard Med. School; Lt., Mass. Police Force; Director, Chemical Laboratories, Mass. Dept. of Public Safety.)

V. Modes and Mechanisms of Scientific Proof

(27) Donaldson,* Dr. Samuel W., Medical Facts that Can or Cannot be Proved by X-Ray; Historical Review and Present Possibilities, 18 Ann. Int. Med. (April 1943) 535; 41 Mich. L. Rev. (April 1943) —.

(* Fellow, Am. College of Radiology; Chairman, Medico-Legal Committee, Radiological Society of North America; Roentgenologist, St. Joseph Mercy Hospital, Ann Arbor, Mich.)

(28) Riseman,* Dr. Joseph E. F., Principles of Electrocardiography, 15 Rocky Mt. L. Rev. (April 1943) —; to be submitted for medical publication.

(* Instructor in Medicine, Harvard Med. School; Instructor in Medicine, Tufts College Med. School; Associate in Medical Research and Associate Visiting Physician, Beth Israel Hospital, Boston.)

(29) Smith, Dr. Hubert Winston and Riseman, Dr. Joseph E. F., Applied Use of the Electrocardiogram in Legal Proceedings, 15 Rocky Mt. L. Rev. (April 1943) —; 18 Ann. Int. Med (July 1943).

(30) Snyder,* Dr. Lemoyne M., Criminal Interrogation with the Lie Detector, 15 Rocky Mt. L. Rev. (April 1943) —; 18 Ann. Int. Med. (April 1943) 551.

(* Medico-Legal Director of the Michigan State Police.)

(31) Boyd,* Dr. William, Protecting the Evidentiary Value of Blood Group Determinations, 1 Clinics (April 1943) 1536; 17 So. Calif. L. Rev. (March 1943) —.

(* Associate Prof. of Biochemistry, Boston Univ. School of Medicine; Special Research Associate, Harvard University; Associate Member, Evans Memorial and Massachusetts Memorial Hospitals.)

(32) Maguire,* Prof. John M., A Survey of Blood Group Decisions and Legislation in the American Law of Evidence, 1 Clinics (April 1943) 1560; 17 So. Calif. L. Rev. (March 1943) —.

(* Professor of Law, Harvard Law School; Asst. Reporter, The American Law Institute's Committee on Evidence, which developed Model Code of Evidence.)

(33) Schoch,* Dr. Magdalena, Determination of Paternity by Blood Grouping Tests: The European Experience, 1 Clinics (April 1943) 1579; 17 So. Calif. L. Rev. (March 1943) —.

(* Formerly Assistant Prof. of Law, Univ. of Hamburg; now Research Assistant in Comparative Law, Harvard Law School.)

(34) Ladd,* Major Mason and Gibson,** Dr. Robert B., Legal-Medical Aspects of Blood Tests to Determine Intoxication, 18 ANN. INT. MED. (April 1943) 564; 29 Va. L. Rev. (April 1943) —.

(* J.A.G.D., U. S. Army; Prof. and Dean, Univ. of Iowa College of Law—on leave of absence; Member of the American Law Institute's Committee on Evidence, which developed Model Code of Evidence.)

(** Associate Professor of Biochemistry, State Univ. of Iowa, Iowa City, Ia.)

VI. SCIENTIFIC PROOF AS A MEANS OF TESTING PREMISES UNDERLYING LEGISLATION OR LEGAL DOCTRINE

(35) Rock,* Dr. John, Medical and Biologic Aspects of Contraception: Scientific Contra-indications to Legal Restriction of Contraceptive Advice, 1 Clinics (April 1943) 1598; to be submitted for legal publication.

(* Instructor in Gynecology, Harvard Med. School; Visiting Surgeon and Director of Fertility, Endocrine and Rhythm Clinics, Free Hospital for Women,

(36) Myerson,* Dr. Abraham, Certain Medical and Legal Phases of Eugenic Sterilization, 18 ANN. INT. MED. (April 1943) 580; 53 Yale L. J. (April 1943) —.

(* Clinical Professor of Psychiatry, Harvard Med. School; Professor (emeritus) of Neurology, Tufts College Medical School; Chief of Department of Neuropsychiatry, Beth Israel Hospital, Boston; Chairman, Committee on Research, American Psychiatric Association.)

VII. MEDICAL CRIMINOLOGY

(37) Lennox,* Dr. William Gordon, Amnesia Real and Feigned, 99 Am. J. Psychiat. (March–April 1943) —; 20 U. of Chi. L. Rev. (April 1943) —.

(* Assistant Prof. of Neurology, Harvard Med. School; Visiting Neurologist, Boston City Hospital; Fellow, Am. Psychiatric Assn.; President, International League against Epilepsy.)

VIII. SOCIO-MEDICO-LEGAL PROBLEMS

(38) Stearns,* Commander A. Warren, Medical and Social Factors in Crime, 18 ANN. INT. MED. (April 1943) 599; 18 Ind. L. J. (July 1943).

(* Commander (MC) U. S. N. R. on active duty; Professor of Psychiatry and Dean, Tufts College Medical School—on leave of absence.)

IX. SCIENTIFIC-LEGAL-MEDICAL CORRELATIONS

(39) Hooton,* Dr. Earnest Albert, Medico-Legal Aspects of Anthropology, 1 Clinics (April 1943) 1612; 15 Rocky Mt. L. Rev. (April 1943) —.

(* Fellow A.A.A.S., Royal Anthropological Institute and Am. Academy of Arts and Sciences; Chairman, Dept. of Anthropology of Harvard University; Curator of Somatology, Peabody Museum, Cambridge, Mass.)

X. Historical Notes on Law-Science Relations

(40) Thayer,* Prof. James, B. Note on Poison in Roman Private Law, 1 Clinics (April 1943) 1625; 23 B. U. L. Rev. (April 1943) —.

(* Professor of Law, Harvard Law School.)

(41) Polsky,* Samuel and Beresford,** Spencer, Some Probative Aspects of the Early Germanic Codes, Carolina and Bambergensis, 18 Ann. Int. Med. (May 1943)—; 23 B. U. L. Rev. (April 1943) —.

(* Student research assistant, in second year of Harvard Law School.)

(** Formerly third year, Harvard Law School, and student research assistant; now Ensign, U. S. Navy.)

(42) Simboli,* David, Medico-Legal Vignettes, 1 Clinics (April 1943).

(* B.A., Harvard 1940; Instructor in private school, New York State.)

PART II

LAW-MEDICINE PROBLEMS AND LEGAL DOCTRINE

I. Expert Testimony and Juridical Mechanisms

(43) Morgan,* Prof. Edmund M., Suggested Remedy for Obstructions to Expert Testimony by Rules of Evidence, 1 Clinics (April 1943) 1627; 20 U. of Chi. L. Rev. (April 1943) —.

(* Royall Professor of Law, Harvard Law School, Cambridge, Mass.; Reporter, The American Law Institute's Committee on Evidence, which developed Model Code of Evidence.)

(44) Pound,* Prof. Roscoe, A Ministry of Justice as a Means of Making Progress in Medicine Available for Courts and Legislatures, 1 Clinics (April 1943) 1644; 20 U. of Chi. L. Rev. (April 1943).

(* Dean Emeritus, Harvard Law School; University Professor, Harvard, Cambridge, Mass.)

(45) Chafee,* Prof. Zechariah, Jr., Privileged Communications: Is Justice Served or Obstructed by Closing the Doctor's Mouth on the Witness Stand? 18 Ann. Int. Med. (April 1943) 606; 53 Yale L. J. (April 1943) —.

(* Langdell Professor of Law, Harvard Law School, Cambridge, Mass.)

II. Private Law Problems of Interest to Medical Men

(46) Dodd,* Prof. Edwin Merrick, Jr., Contracts Not to Practice Medicine, 18 Ann. Int. Med. (April 1943) 618; 23 B. U. L. Rev. (April 1943)—.

(* Professor of Law, Harvard Law School, Cambridge, Mass.)

(47) Scott,* Prof. Austin Wakeman, Tort Liability of Hospitals, 18 Ann. Int. Med. (April 1943) 630; 17 Tenn. L. Rev. (April 1943) 838.

(* Dane Professor of Law, Harvard Law School, Cambridge, Mass.)

(48) Ludlam,* Warren, Plaintiff's Duty to Minimize Defendant's Liability by Surgery, 17 Tenn. L. Rev. (April 1943) 821; to be submitted for medical publication.

(* LL.B. Harvard Law School, January 1943; Associate of Baker, Botts, Andrews and Wharton, Attorneys and Counselors, Houston, Texas.

(49) Smith, Hubert Winston, Legal Responsibility for Non-Therapeutic Surgery; to be submitted for medical publication.

(50) McCurdy,* Prof. William Edward, Insanity as a Ground for Annulment or Divorce in English and American Law, 99 Am. J. Psychiat. (May-June 1943) —; 29 Va. L. Rev. (April 1943) —.

(* Professor of Law, Harvard Law School, Cambridge, Mass.)

(51) Arthur,* Prof. William R., Some Legal Aspects of the Use of Drugs, (Tentative title), 15 Rocky Mt. L. Rev. (April 1943) —; to be submitted for medical publication.
(* Professor of Law, University of Colorado, Boulder, Colo.)

III. Public Law Problems of the Medical Profession

(52) Powell,* Prof. Thomas Reed, Compulsory Vaccination and Sterilization; Constitutional Aspects, 18 Ann. Int. Med. (April 1943) 637; 21 N. C. L. Rev. (April 1943) —.
(* Story Professor of Law, Harvard Law School, Cambridge, Mass.)

(53) Griswold,* Prof. Erwin N., The Doctor's Federal Taxes, 18 Ann. Int. Med. (April 1943) 647; 32 Calif. L. Rev. (June 1943)—.
(* Professor of Law, Harvard Law School, Cambridge, Mass.)

REVIEWS

Advances in Pediatrics. Vol. 1. Edited by ADOLPH G. DESANCTIS, M.D. 306 pages; 23.5 × 16 cm. Interscience Publishers, Inc., New York, N. Y. 1942. Price, $4.50.

Because it is difficult for physicians to keep abreast of pediatric literature, this book was written to present a few of the more important recent advances. It truly "is a collection of personalized monographs by outstanding authorities."

Subjects discussed are toxoplasmosis, virus diseases, chemotherapy, electroencephalography, vitamin K, ductus arteriosus, prematures, tuberculosis, and endocrinology.

This is a very fine book and well worth owning.

W. M. S.

Laboratory Diagnosis of Protozoan Diseases. By CHARLES FRANKLIN CRAIG, M.D., M.A. (Hon.), F.A.C.S., F.A.C.P., Col., U. S. Army (Retired), D.S.M. 349 pages; 24 × 15.5 cm. Lea and Febiger, Philadelphia. 1942. Price, $4.50.

This text embodies a comprehensive presentation of laboratory methods for the diagnosis of protozoan diseases. The following subjects are included: Amebiasis and other Intestinal Flagellates; the Leishmaniases, Kala-Azar, Oriental Sore and Espundia; the Trypanosomiases, east and west African type and Chagas' disease; Coccidiosis; Malaria; and Balantidiasis. The accurate diagnosis of these diseases is dependent upon carefully performed laboratory tests. Much emphasis is placed on laboratory diagnostic methods which are discussed in great detail; clinical features are mentioned only briefly.

Each protozoan organism is analyzed by a consideration of the following points, namely: morphology, life cycle, collection and preparation of material for examination, staining methods, cultivation, serological tests and animal inoculation. The evidence presented in this analysis is evaluated, for each protozoan, in a section entitled "Critique of Diagnostic Methods." This is an expression of the subjective opinions of the author based upon forty years of personal experience in this field and is of great value to the reader.

The bibliography is ample and up to date, and there are many helpful illustrations and photomicrographs. The colored plates of the various malaria plasmodia are particularly well displayed.

This book will be of much value to anyone interested in protozoölogy or concerned with the diagnosis of these diseases.

E. T. L.

BOOKS RECEIVED

Books received during February are acknowledged in the following section. As far as practicable, those of special interest will be selected for review later, but it is not possible to discuss all of them.

The Sight Saver. By C. J. GERLING. 202 pages; 21 × 14 cm. 1943. Harvest House, New York City. Price, $2.00.

Pancreatic Function and Pancreatic Disease Studied by Means of Secretin. By HENRIK O. LAGERLÖF, M.D. With a foreword by JOSEPH H. PRATT, M.D. 289 pages; 23.5 × 15 cm. 1943. The Macmillan Company, New York City. Price, $3.50.

Diseases of the Breast. By CHARLES F. GESCHICKTER, M.A., M.D., with a special section on treatment in collaboration with MURRAY M. COPELAND, A.B., M.D., F.A.C.S. 829 pages; 23.5 × 16 cm. 1943. J. B. Lippincott Co., Philadelphia. Price, $10.00.

Essentials of Gynecology. By WILLARD R. COOKE, M.D., F.A.C.S. 474 pages; 23.5 × 16 cm. 1943. J. B. Lippincott Co., Philadelphia. Price, $6.50.

Treatment of Fractures. By GUY A. CALDWELL, M.D., F.A.C.S. 303 pages; 24 × 16 cm. 1943. Paul B. Hoeber, Inc., New York City. Price, $5.00.

Bronchiectasis. By JAMES R. LISA, B.S., M.D., and MILTON B. ROSENBLATT, B.S., M.D. 190 pages; 24 × 16 cm. 1943. Oxford University Press, New York City. Price, $4.00.

Diagnostico Diferencial y Tratamiento de las Enfermedades Internas. Second Edition. By RODOLFO DASSEN. 774 pages; 25.5 × 17 cm. 1943. El Ateneo, Buenos Aires.

Transactions of the Association of American Physicians. Vol. LVII and Index volume of vols. XXXI to LVI. 334 pages (vol. LVII); 287 pages (index volume); 23 × 15 cm. 1943. Association of American Physicians.

Clinical Laboratory Diagnosis. By SAMUEL A. LEVINSON, M.S., M.D., and ROBERT P. MACFATE, Ch.E., M.S., Ph.D. 980 pages; 24 × 15.5 cm. 1943. Lea and Febiger, Philadelphia, Pennsylvania. Price, $10.00.

The Antigonadotropic Factor with Consideration of the Antihormone Problem. By BERNHARD ZONDEK and FELIX SULMAN. 185 pages; 23.5 × 16 cm. 1943. Williams and Wilkins Co., Baltimore, Maryland. Price, $3.00.

Clinical Pediatrics. By I. NEWTON KUGELMASS, M.D., Ph.D., Sc.D. 393 pages; 22 × 14.5 cm. 1943. Oxford University Press, New York City. Price, $2.00.

Food Poisoning. By G. M. DACK, Ph.D., M.D. 138 pages; 23.5 × 16 cm. 1943. University of Chicago Press, Chicago, Illinois. Price, $2.00.

COLLEGE NEWS NOTES

Additional A. C. P. Members in the Armed Forces

Already published in preceding issues of this journal were the names of 1,321 Fellows and Associates of the College on active military duty. Herewith are reported the names of 44 additional members, bringing the grand total to 1,365.

Frank M. Acree

Orange V. Calhoun
Manley J. Capron
Charles J. Crawley

Francis R. Dieuaide

Orin J. Farness
Louis S. Faust
Stephen A. Foote, Jr.

James T. Gilbert, Jr.
John E. Greutter, Jr.
William H. Griffith

Joseph E. Harenski
Carl A. Hartung

R. Harold Jones

Donald S. King
Robert C. Kirk
Harry C. Kroon

Herman Lande
Joseph D. Landry
Robert W. Langley
Stephen L. R. Lirot

David W. McCarty
Francis E. McDonough
Julian E. McFarland
Roger S. Mitchell, Jr.

Hugh B. O'Neil

Frank Perlman
Carlos A. Pons
Lee T. Pruit

Lewis K. Reed
John M. Rice
David I. Rutledge

John C. Schlappi
S. Charlton Shepard
Donald G. Stannus
Irving E. Steck
Morris F. Steinberg
Russell A. Stevens

Harry E. Thompson
J. Lawn Thompson, Jr.
T. Noxon Toomey

Dwight L. Wilbur
Bernard P. Wolff

Joseph Ziskind

New Life Members of the College

The following Fellows of the American College of Physicians have subscribed to Life Membership, and their initiation fees and Life Membership subscriptions have been added to the permanent Endowment Fund of the College:

Dr. Roy Colonel Mitchell, Mt. Airy, N. C.
Dr. Jesse Dean Riley, State Sanatorium, Ark.
Dr. Vernon Cecil Rowland, Cleveland, Ohio
Dr. Frederick Slyfield, Seattle, Wash.

Gifts to the College Library

We gratefully acknowledge receipt of the following gifts to the College Library of Publications by Members:

Books

Dr. James R. Lisa, F.A.C.P., New York, N. Y.—"Bronchiectasis";
Dr. Harry R. Litchfield, F.A.C.P., Brooklyn, N. Y.—"Therapeutics of Infancy and Childhood," Vol. I;
Dr. Franklin B. Peck, F.A.C.P., Indianapolis, Ind.—"Diabetes Abstracts," 1942 edition.

Reprints

Dr. William A. D. Anderson (Associate), St. Louis, Mo.—13 reprints;
Dr. George E. Baker, F.A.C.P., Casper, Wyo.—2 reprints;
Dr. Robert S. Berghoff, F.A.C.P., Chicago, Ill.—1 reprint;
J. Edward Berk, F.A.C.P., Captain, (MC), U. S. Army—1 reprint;
Dr. Leon L. Blum (Associate), Terre Haute, Ind.—5 reprints;
Dr. Ralph O. Clock, F.A.C.P., Brooklyn, N. Y.—1 reprint;
Dr. Charles F. De Garis, F.A.C.P., Oklahoma City, Okla.—2 reprints;
Dr. Elliott B. Edie, F.A.C.P., Uniontown, Pa.—1 reprint;
Dr. Guy H. Faget, F.A.C.P., U. S. Public Health Service, Carville, La.—1 reprint;
Donald E. Forster, F.A.C.P., Captain, (MC), U. S. Army—1 reprint;
Joseph J. Furlong, F.A.C.P., Lieutenant, (MC), U. S. Army—2 reprints;
Dr. Mayer A. Green (Associate), Pittsburgh, Pa.—1 reprint;
Dr. Lynn T. Hall, F.A.C.P., Omaha, Nebr.—3 reprints;
Dr. John N. Hayes, F.A.C.P., Saranac Lake, N. Y.—3 reprints;
Dr. William E. Jahsman, F.A.C.P., Ferndale, Mich.—1 reprint;
Dr. John J. Weber, F.A.C.P., Brooklyn, N. Y.—1 reprint;
Dr. Willard R. Wirth, F.A.C.P., New Orleans, La.—1 reprint.

Dr. Theodore J. Abernethy (Associate), Washington, D. C., is now a member of the Commission on Acute Respiratory Diseases, and is stationed at Fort Bragg, N. C. He is devoting his full time to research on respiratory diseases in the Army.

The American College of Chest Physicians, through its Board of Regents, has announced the cancellation of its 1943 Annual Session.

The Executive Board of the American Public Health Association has announced that a Wartime Public Health Conference and the 72nd Annual Business Meeting of the Association will be held in New York, N. Y., October 12–14, 1943. The program will be devoted exclusively to wartime emergency matters as they affect public health and the public health profession.

The 4th International Assembly of the International College of Surgeons will be held in New York, N. Y., June 14–16, 1943. The program will be devoted to war surgery and rehabilitation.

The American Urological Association has announced the cancellation of its 1943 meeting. The Association also announced that the Five Hundred Dollar Research Prize offered annually will not be awarded this year.

Leon H. Warren (Associate), Major, (MC), U. S. Army, spoke on "Military Dermatology" in connection with a series of lectures on the professional aspects of military medicine conducted at George Washington University School of Medicine on February 5, 1943.

At the invitation of the Governor of the Territory of Hawaii, Dr. George Baehr, F.A.C.P., Chief Medical Officer, Office of Civilian Defense, Washington, D. C., recently conferred with local authorities on civilian defense activities. Defense activities of the islands are being reorganized now that the government is in the process of being transferred from Army to civil authorities.

On February 24, 1943, Dr. Baehr spoke at the War Conference of the California Hospital Association held in Berkeley, Calif., on "Recent Observations in England and Scotland" and "Hospital Participation in the Emergency Medical Service."

On February 26, 1943, Parke, Davis & Company, Detroit, Mich., was awarded the Army-Navy "E" for excellence in the production of materials for saving lives. The "E" pennant was presented to Dr. A. W. Lescohier, President of the Company, by John M. Willis, F.A.C.P., Brigadier General, (MC), U. S. Army, Commanding General at Camp Grant, Ill.

Honored guests at the presentation ceremony included Dr. Bruce H. Douglas, F.A.C.P., Health Commissioner of the City of Detroit, and Dr. Warren B. Cooksey, F.A.C.P., Medical Director of the Detroit Section of the American Red Cross.

Dr. B. Earl Clarke, F.A.C.P., Providence, R. I., recently spoke on "The History of the Microscope and Early Microscopy" at a meeting of the Penobscot County Medical Association in Bangor, Maine.

On January 4, 1943, Dr. Joseph Yampolsky, F.A.C.P., Atlanta, Ga., was awarded the L. C. Fischer award of One Hundred Dollars for the best written paper presented before the Fulton County (Ga.) Medical Society during the past year. The award, which was presented by Dr. Allen H. Bunce, F.A.C.P., Atlanta, was given Dr. Yampolsky for his work on "Syphilitic Aortitis in a Nine Year Old Child."

Dr. E. Perry McCullagh, F.A.C.P., Cleveland, Ohio, spoke on "Male Sex Hormone" at a meeting of the Allegheny County Medical Society in Pittsburgh, Pa., January 19, 1943.

The U. S. Army General Hospital at Temple, Tex., has been named the McCloskey General Hospital in honor of James A. McCloskey, Major, (MC), U. S. Army, the first regular Army medical officer to lose his life in the present war with Japan. The McCloskey General Hospital, which was opened October 20, 1942, has a capacity at present of 1,500 beds, and is equipped to handle all types of cases.

Sloan G. Stewart (Associate), Major, (MC), U. S. Army, has been named Chief of Medicine.

Dr. George S. Bond, F.A.C.P., Indianapolis, spoke on "Criteria in the Evaluation of Abnormal Hearts" at a two-day conference on industrial health conducted in Indianapolis, February 25–26, 1943, by the Committee on Industrial Health of the Indiana State Medical Association.

Dr. Andrew C. Woofter, F.A.C.P., has been assigned by the U. S. Public Health Service to Iowa to direct the venereal disease program in that State during the war period.

Dr. Raymond Hussey, F.A.C.P., Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Md., has been appointed Scientific Director of the new Army Industrial Hygiene Laboratory at Johns Hopkins University School of Hygiene and Public Health.

Dr. Andrew P. Biddle, F.A.C.P., Detroit, Mich., has been elected President of the Detroit Library Commission.

Dr. Elmer E. Glenn, F.A.C.P., Springfield, Mo., was recently named President of the Missouri Tuberculosis Association.

Dr. Ellen C. Potter, F.A.C.P., Trenton, N. J., has been appointed Director of Medicine and Chairman of the Child Care Committee of the Office of Civilian Defense Director of the State of New Jersey.

Dr. Russell L. Cecil, F.A.C.P., New York, N. Y., has been named President of the New York Rheumatism Association. This Association was formally organized January 22, 1943, to "unite physicians in New York and environs who are interested in arthritis and rheumatic disorders, to improve the treatment of patients with arthritis, particularly those attending the arthritis clinics in Greater New York, and to stimulate research on these disorders."

Dr. Raymond L. Gregory, F.A.C.P., has accepted an appointment as Professor of Medicine and Director of the Outpatient Clinic, and Continuation Courses at the University of Texas Medical Branch, Galveston.

On February 11, 1943, Dr. L. Maxwell Lockie, F.A.C.P., Buffalo, N. Y., lectured on "The Management of Arthritis, Acute and Chronic," and on February 23, Dr. Clayton W. Greene, F.A.C.P., Buffalo, lectured on "Renal Lesions Simulating Other Maladies" before the Madison County Medical Society in Oneida, N. Y. These lectures were arranged by Dr. Greene under the auspices of the Medical Society of the State of New York as postgraduate instruction on the treatment of common diseases.

Dr. C. Lydon Harrell, F.A.C.P., Norfolk, Va., was named President of the Seaboard Medical Association at its annual meeting in Wilson, N. C., December 1–3, 1942.

James O. Gillespie, F.A.C.P., Colonel, (MC), U. S. Army, has been awarded the Distinguished Service Medal for "developing hospitals on Bataan Peninsula with only extremely limited personnel and equipment." Colonel Gillespie was Chief of the Medical Service at the Sternberg General Hospital in Manila at the outbreak of the war. He is now a prisoner of war.

On March 26, 1943, Dr. Lloyd F. Craver, F.A.C.P., New York, N. Y., delivered the 19th Ludvig Hektoen Lecture of the Frank Billings Foundation under the auspices of the Institute of Medicine of Chicago. Dr. Craver discussed "The Diagnostic Problems of Early Cancer."

The New Orleans (La.) Graduate Medical Assembly held its 7th Annual Assembly, March 15–18, 1943. The program included lectures, clinics, symposiums,

scientific and technical exhibits, medical motion pictures and round table luncheons. Among the Fellows of the College who participated were Dr. Tinsley R. Harrison, Winston-Salem, N. C., Dr. Louis Hamman, Baltimore, Md., Dr. Howard T. Karsner, Cleveland, Ohio, and Lieutenant Colonel Edgar V. Allen, (MC), U. S. Army.

On February 15, 1943, Edgar E. Hume, F.A.C.P., Colonel, (MC), U. S. Army, delivered the 22nd Annual Beaumont Lecture at a meeting of the Wayne County Medical Society, Detroit, Mich. Colonel Hume spoke on "Contributions of U. S. Army Medical Officers to Science."

At the annual meeting of the Federation of State Medical Boards held in Chicago, Ill., February 16, 1943, Dr. Frank M. Fuller, F.A.C.P., Keokuk, Iowa, was inducted into the Presidency. Dr. Walter L. Bierring, F.A.C.P., Des Moines, Iowa, was reëlected Secretary-Treasurer.

At the annual meeting of the American Foundation for Tropical Medicine, Inc., New York, N. Y., January 19, 1943, Thomas T. Mackie, F.A.C.P., Lieutenant Colonel, (MC), U. S. Army, was elected President of the Foundation and Dr. Willard C. Rappleye, F.A.C.P., New York, N. Y., Vice President.

The Chamber of Commerce of the United States recently announced the creation of a National Health Advisory Council to consider national health problems in connection with the war program. Dr. James S. McLester, F.A.C.P., Professor of Medicine, University of Alabama School of Medicine, Birmingham, was named General Chairman of the Council. Among the other Fellows of the College who have been named members of the Council are:

Dr. James E. Paullin, Atlanta, Ga.
Dr. George Morris Piersol, Philadelphia, Pa.
Dr. Russell M. Wilder, Rochester, Minn.
Dr. Joseph C. Doane, Philadelphia, Pa.
Dr. Louis Hamman, Baltimore, Md.
Dr. Wallace M. Yater, Washington, D. C.
Dr. Arthur F. Chace, New York N. Y.
Dr. Paul D. White, Boston, Mass.
Dr. J. Burns Amberson, Jr., New York, N. Y.
Dr. Felix J. Underwood, Jackson, Miss.
Dr. Harry E. Ungerleider, New York, N. Y.

Ross T. McIntire, F.A.C.P., Rear Admiral, (MC), U. S. Navy, The Surgeon General, received the honorary degree of Doctor of Science at the commencement exercises of Marquette University School of Medicine, Milwaukee, Wis., February 13, 1943.

Dr. Samuel M. Poindexter, F.A.C.P., Acting College Governor for Idaho, Boise, was recently appointed a member of the Idaho State Board of Medical Examiners.

The Medical College of Virginia conducted a symposium on "Nutrition," March 25–27, in Richmond, Va. Among those who participated in the program were Dr. William H. Sebrell, Jr., F.A.C.P., U. S. Public Health Service, Bethesda, Md., and Dr. Virgil P. Sydenstricker, F.A.C.P., Augusta, Ga.

Dr. Robert Chobot, F.A.C.P., New York, N. Y., was recently elected President of the Society for the Study of Asthma and Allied Conditions and Dr. Will Cook Spain, F.A.C.P., New York, N. Y., was reëlected Secretary.

The American Association of Industrial Physicians and Surgeons, the American Industrial Hygiene Association and the National Conference of Governmental Hygienists will hold a joint four-day "War Conference" in Rochester, N. Y., May 24–27, 1943. Among the problems that will be discussed from a practical standpoint are the mass entry of women into industry; older-age employees, with their various associated problems; proper placement and employability considerations of the 4F rejectees; rehabilitation and proper employment of those already discharged from the military services because of disabling conditions; toxic and other hazards from new substances; new processes, and the use of substitute materials; absenteeism; fatigue; nutrition; effects of long hours, double shifts; two-job workers; overtime; increased industrial accident rates; advances in the treatment of illnesses and injuries; and many others.

Lt. Col. H. L. Quickel, (MC), U. S. A., Retired, on March 15 assumed the duty of Senior Examining Physician (chest) with the North Carolina State Board of Health at Raleigh, N. C.

Schedule of Future Regional Meetings

Multi-State Regional Meetings for the duration of the War will take the place of the customary Annual Session. Already such meetings have been held in Philadelphia, in Chicago, in Boston and in New Orleans. These have met with universal favor and satisfaction. The attendance has averaged 40 per cent of the membership in the States represented, with a very large representation of guest attendants from the Army, Navy and Public Health Service. Programs are streamlined and carefully organized on subjects of the greatest importance and interest in these times, not only to civilian physicians, but to Medical Officers in our Armed Forces.

The customary program is an all-day session, concluding with an evening dinner-meeting, addressed by the President and other Officers of the College, and by high ranking Medical Officers and authorities from the Armed Forces. These meetings require but a minimum of lost time from practice or from active duty, and they afford not only an inspiring day of postgraduate work, but a welcome respite from strenuous and continuous work. The regional character of the meetings reduces the amount of travel, and the shortness of the sessions makes minimum demand upon hotel and meeting facilities.

Schedule:

Washington (Delaware, District of Columbia, Maryland, North Carolina, Virginia and West Virginia), April 24, 1943.
Dr. Wallace M. Yater, Washington, Governor for the District of Columbia, *General Chairman.*

Great Falls (Montana and Wyoming), May 1.
Dr. E. D. Hitchcock, Great Falls, Governor for Montana, *General Chairman.*

Kansas City (Kansas, Missouri, Nebraska and Oklahoma), May 8.
Dr. A. C. Griffith, Kansas City, Third Vice President, *General Chairman.*

Columbus (Kentucky, Ohio, Western Pennsylvania and West Virginia), May 14.
Dr. A. B. Brower, Dayton, Governor for Ohio, *General Chairman;* Dr. Charles A. Doan, Columbus, *Local Chairman.*

Jacksonville (Alabama, Florida, Georgia and South Carolina), May (?)
Dr. T. Z. Cason, Jacksonville, Governor for Florida, *General Chairman.*

SPECIAL NOTICE

The Research Council on Problems of Alcohol

ANNOUNCE A $1,000 AWARD

For Outstanding Research on Alcoholism During 1943

1. The research for which the award will be granted must contribute new knowledge, in some branch of medicine, biology, or sociology, important to the understanding or prevention or treatment of alcoholism.

2. Any scientist in the United States, Canada or Latin America is eligible for the award.

3. The project may have been inaugurated at any time in the past or during the year 1943, provided (a) that a substantial part of the work be carried on during the year 1943, (b) that it be developed to a point at which significant conclusions are possible before the end of the year, and (c) that a report on the work has not been previously announced and described before a scientific body or previously published.

4. It is desirable, but not necessary, that those planning to work for the award send to the Council before March 1, 1943, a statement of such intention. If the Council receives such information, it can be helpful in the prevention of undesirable duplication of effort. If a research project is conceived and inaugurated later in the year 1943, a statement of intention may be sent to the Council at a later date.

5. A report on the work and resulting conclusions must be submitted to the Research Council on Problems of Alcohol on or before February 15, 1944. The Council will provide an outline for use in the preparation of reports.

6. The award will be in cash, and will be given to an individual scientist whose work is judged sufficiently outstanding and significant to merit the award.

7. The Committee of Award will consist of five persons—an officer of the American Association for the Advancement of Science, and four representatives of the Scientific Committee of the Research Council on Problems of Alcohol.

8. If the Committee is not convinced of the outstanding merit of the research done during 1943, as described in reports submitted, it may, at its discretion, postpone the award until another year, or until such time as work of such merit has been performed.

The Council will send on request, to any scientist, an outline of basic policies governing its research program, lists of Council studies (completed, under way and contemplated), and information regarding the studies of other agencies.

Scientists planning to do research in connection with the award may send a statement of intention to The Director, The Research Council on Problems of Alcohol, *Pondfield Road West, Bronxville, New York.*

A. C. P. REGIONAL MEETING

COLUMBUS, MAY 14, 1943

A Regional Meeting of the American College of Physicians for the States of Kentucky, Ohio, West Virginia and Western Pennsylvania will be held in Columbus, Friday, May 14, with headquarters at the Neil House. The meeting is sponsored by the College Governors for those States, Dr. Chauncey W. Dowden, Louisville, Governor for Kentucky; Dr. A. B. Brower, Dayton, Governor for Ohio; Dr. Albert H. Hoge,* Bluefield, Governor for West Virginia; Dr. R. R. Snowden, Pittsburgh, Governor for Western Pennsylvania. Dr. Brower is the General Chairman and Dr. Charles A. Doan of Columbus is the Chairman of Local Arrangements.

The scientific program will open at 10:00 a.m. at the Neil House and except for a luncheon intermission, will continue through the day to 5:00 p.m. A concluding dinner meeting will be held in the evening when a number of distinguished guests will make brief addresses, among whom will be Dr. James E. Paullin, President, Atlanta, Ga.; Lt. Col. F. Dennette Adams, Columbus, Medical Consultant to the Fifth Service Command and official envoy of the Surgeon General of the U. S. Army; Comdr. Edward L. Bortz, Philadelphia, Chairman of the Committee on War-Time Graduate Medical Meetings and envoy of the Surgeon General of the U. S. Navy; Brigadier General Eugen G. Reinartz of the School of Aviation Medicine, Randolph Field, Tex.; Edward R. Loveland, Executive Secretary of the College, Philadelphia.

The tentative program follows.

(Topic not yet announced.) Eugen G. Reinartz, F.A.C.P., Brigadier General, (MC), U.S.A., School of Aviation Medicine, Randolph Field, Tex.

"The Atypical or Virus Pneumonia." Bruce Kenneth Wiseman, F.A.C.P., Professor of Medicine, Ohio State University College of Medicine, Columbus, Ohio.

"Some Clinical Aspects of Epidemic Meningococcus Infections." F. Dennette Adams, F.A.C.P., Lt. Col., (MC), U.S.A., Medical Consultant, Fifth Service Command, Fort Hayes, Columbus, Ohio.

"Recent Trend on Experiment and Theory on the Influence of Training on Some Visual Function." Samuel Renshaw, Ph.D. (by invitation), Professor of Experimental Psychology, Ohio State University, Columbus, Ohio.

"Industrial Medical Problems in War Production." T. Lyle Hazlett, F.A.C.P., Professor of Industrial Medicine, University of Pittsburgh School of Medicine; Medical Director, Westinghouse Electric & Manufacturing Co.; Pittsburgh, Pa.

"The Problem of Tuberculosis in Apparently Healthy Man as Shown in the Routine Examinations for Induction into the Armed Forces." C. Howard Marcy, F.A.C.P., Associate Professor of Medicine, University of Pittsburgh School of Medicine; Medical Director, Tuberculosis League of Pittsburgh; Pittsburgh, Pa.

"Traumatic Lesions of the Heart." Edward J. McGrath (by invitation), Department of Surgery, University of Cincinnati College of Medicine, Cincinnati, Ohio.

(Topic not yet announced.) Roy W. Scott, F.A.C.P., Professor of Clinical Medicine, Western Reserve University School of Medicine; Physician-in-Chief, City Hospital; Cleveland, Ohio.

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* Deceased, April 9, 1943.

"Endocrine Regulation of Growth." Willard O. Thompson, F.A.C.P., Associate Clinical Professor of Medicine, Rush Medical College, Chicago, Ill.

"Clinical Endoscopy Studies of the Tracheal Tree." Maurice G. Buckles, F.A.C.P., Instructor in Medicine, University of Louisville School of Medicine, Louisville, Ky.

"Mineral Metabolism." Zolton T. Wirtschafter (Associate), Major, (MC), U.S.A., Chief, Section of Civilian Medicine and Industrial Hygiene, Wright Field, Dayton, Ohio.

"Deficiency Diseases in Relationship to the Nervous System." Charles D. Aring (by invitation), Associate Professor of Medicine, University of Cincinnati College of Medicine, Cincinnati, Ohio.

"The National History of Tuberculous Tracheal Bronchitis." David Salkin, F.A.C.P., Instructor in Medicine, West Virginia University School of Medicine; Medical Director, Hopemont Sanitarium, Hopemont, W. Va.

OBITUARIES

DR. OLIVER M. LAYTON

Dr. Oliver M. Layton, F.A.C.P., Fond du Lac, Wisconsin, was born January 20, 1871, and died on December 27, 1942. He received his medical degree from Rush Medical College in 1895. He engaged in the practice of medicine in Metropolis, Michigan for a period of five years. In 1901 Dr. Layton came to Fairwater, Wisconsin. He was also a registered Pharmacist in Fairwater. He continued his practice in Fairwater until 1912 at which time he returned to the Rush Medical College for postgraduate study. He returned to Fond du Lac, Wisconsin, in 1916 where he engaged in the practice of Internal Medicine until the time of his death.

Dr. Layton became a member of the Wisconsin State Medical Society in 1916. He was an active member of the Fond du Lac County Medical Society, acting first as Secretary of the organization and in 1920 he was elected President of the society. He was elected a Fellow of the American College of Physicians in 1920.

During the World War I, Dr. Layton was a member of the Medical Reserve. He served as Medical Director of the District Advisory Board of the American Red Cross. He was appointed as Medical Director of the St. Agnes School of Nursing at Fond du Lac, Wisconsin. Dr. Layton was an earnest student of medicine, devoted to his patients and was held in high esteem by his fellow practitioners. He was active in civic affairs and devoted much time to teaching in the school of nursing and instructing in the Red Cross.

Dr. Layton died suddenly from coronary thrombosis on December 27, 1942. He is survived by his wife, one son and two daughters. His many grateful patients, as well as his brother practitioners, mourn his passing.

ELMER L. SEVRINGHAUS, M.D., F.A.C.P.,
Governor for Wisconsin

DR. PETER WHITMAN ROWLAND

Dr. Peter Whitman Rowland, Jr., one of Memphis' leading physicians, died suddenly January 10, 1943, while at work. He was born January 23, 1893, at Coffeeville, Miss. He received his B.S. degree from the University of Mississippi in 1912, and his degree in medicine from the University of Virginia in 1919.

He was Assistant Professor of Bacteriology and Pathology at the University of Mississippi during 1920 and 1921, and Assistant Professor of Medicine in the University of Tennessee from 1930 to 1940.

He had been a Fellow in the American College of Physicians since 1928. He was a member of the Memphis and Shelby County Medical Society, the Tennessee State Medical Association, the Southern Medical Association,

the American Medical Association, and a Diplomate of the American Board of Internal Medicine.

Dr. Rowland was an intense and profound student of medicine, especially interested in diseases of the cardiovascular system and diabetes mellitus.

He leaves a very distinguished father who has taught in the Medical School of the University of Mississippi for 41 years; his wife, Mrs. Jane Taliaferro Rowland; and a son, Peter Whitman Rowland III.

WILLIAM CALVERT CHANEY, M.D., F.A.C.P.,
Governor for Tennessee

DR. FRED HERMAN KRUSE

Dr. Fred Herman Kruse, F.A.C.P., was born in Kentucky, June 30, 1879; he died at his home, in San Francisco, January 14, 1943.

Dr. Kruse spent his early life in California and became a teacher in the public schools before entering upon the study of medicine. He received the degree of B.S. in 1913 and M.D. in 1915 from the University of California. In 1915 and 1916 he served a medical internship at the University of California. With the exception of the following year, during which he was a Medical Resident at the Johns Hopkins Hospital, Baltimore, Dr. Kruse maintained an active teaching and visiting connection with the Medical School and Hospital of the University of California. At the time of his death, and for some years before, he was Clinical Professor of Medicine and Chief of the Gastro-enterology Clinic. He was also a member of the Staff of the Franklin Hospital in San Francisco.

Dr. Kruse belonged to the San Francisco County Medical Society, California State Medical Association, the California Academy of Medicine and American Gastro-enterological Association. He was a Fellow of the American Medical Association, and a Fellow of the American College of Physicians since 1931; Diplomate, American Board of Internal Medicine.

As a diagnostician and consultant, Dr. Kruse enjoyed a well-earned reputation on the Pacific Coast. His services were in constant demand and he was never too busy nor too tired to devote meticulous care and much thought to the diagnostic problems of his patients. Gifted with a friendly, sympathetic personality, he was able to achieve much in his career that scientific medicine alone would scarcely have accomplished. Modest and self-sacrificing, he was entirely devoted to family, friends, students and patients.

ERNEST H. FALCONER, M.D., F.A.C.P.,
Governor for Northern California

DR. WILLIAM BYRNE BROWN

Dr. William Byrne Brown, F.A.C.P., Director of the Division of Health Education at Stephens College, Columbia, Mo., died suddenly, November 8, 1942, of heart disease. He was born in Webster, W. Va., August 2, 1904.

He received his A.B. degree from West Virginia University in 1927 and his B.S. degree in medicine from the same institution in 1933. He graduated from Rush Medical College, Chicago, in 1934 and received his degree after an internship at St. Luke's Hospital in that city. In September, 1936, he went to Stephens College as Resident Physician in the Division of Health Education, and in June, 1939, upon the retirement of Dr. Frank G. Nifong, Dr. Brown succeeded to the Directorship of Health Education, which position he held at the time of his death.

Dr. Brown took an active part in the activities of the American Student Health Association, holding the office of Chairman of the Committee on Organization and Administration at the time of his death. He was a member of the Boone County Medical Society (President, 1941), a member of the Missouri State Medical Association, a Fellow of the American Medical Association, and had been a Fellow of the American College of Physicians since 1941.

RALPH A. KINSELLA, M.D., F.A.C.P.,
Governor for Missouri

DR. HERBERT ELDRIDGE MILLIKEN

Dr. Herbert Eldridge Milliken died as the result of myocardial infarction at Portland, Maine February 9, 1943. His final illness was a recurrence of a disease which had forced his retirement from practice four years earlier.

Dr. Milliken was born in Surry, Maine, January 25, 1880. He was graduated from Bowdoin Medical School in 1901 and served as house officer at the Maine General Hospital in Portland and the Rhode Island State Hospital in Providence. He practiced for a year in Northeast Harbor, Maine, then moved to Waterville where he remained until 1910. On the latter date he removed to Portland and continued his practice there for the remainder of his life. In 1912 he left for a year of study in Vienna. On his return to Portland, Dr. Milliken restricted his practice to internal medicine.

As an officer in the Medical Reserve Corps, United States Army, during World War I, Dr. Milliken was at first in charge of the Gastro-enterological Service at the Base Hospital at Camp Dodge, Iowa. He was later transferred to Camp Greene, North Carolina to serve as lecturer and instructor in physical diagnosis during the mobilization period. He was ordered overseas August 14, 1918, served with Base Hospital 54 and later was made Chief of Medical Service of Unit 8, a post which he held until his discharge from the service July 31, 1919. He then continued the practice of internal medicine in Portland for the next twenty years.

Dr. Milliken was elected to Fellowship in The American College of Physicians in 1927. He was a member of the American Medical Association, the Maine Medical Association, the Cumberland County Medical Society, the Portland Medical Club, and the Maine Historical Society. He

was Consultant in Internal Medicine, U. S. Public Health Service and held a commission as Lieutenant Colonel, Medical Reserve Corps, United States Army. For many years he was a member of the medical staff of the Maine General Hospital. He served as instructor in physical diagnosis at the Bowdoin Medical School from 1913 to 1917.

Dr. Milliken will be remembered, alike by colleagues and by patients, as a thoughtful, studious physician, whose decisions were made only after thorough investigation and careful deliberation.

E. H. DRAKE,
Governor for Maine

DR. ERNEST BORING PORTER

Dr. Ernest Boring Porter, F.A.C.P., of Altadena, California, died of coronary thrombosis on November 15, 1942.

Dr. Porter was born in New Jersey on February 26, 1895. He received his B.S. degree in 1924 and graduated in 1925 as Doctor of Medicine from Northwestern University Medical School.

For the first four years of his brief medical career he was associated with Dr. James F. Churchill of San Diego, from whom he gained much knowledge of Internal Medicine. From 1925 to 1934 he was a Member of the Staff of the Mercy Hospital, San Diego, at which institution he attained the position of Chief of Staff for one year. During the same period he served on the medical staff of the Scripps Metabolic Hospital and the San Diego County General Hospital, where he was Chief of Staff for two years. Dr. Porter was a member of the San Diego Medical Society, the California Medical Association and a Fellow of the American Medical Association. In 1938 he became a Fellow of the American College of Physicians.

A few years ago failing health compelled him to retire from active practice, and his untimely death at the age of forty-seven brought a close to a most promising career in the field of Internal Medicine.

ROY E. THOMAS, M.D., F.A.C.P.,
Governor for Southern California